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BIENNIAL REPORT

OF THE

STATE BOARD OF HORTICULTURE

OF THE

STATE OF CALIFORNIA,

FOR 1885 AND 1886.

ALSO, APPENDIX FOR 1887.

OFFICE: NO. 220 SUTTER STREET, SAN FRANCISCO.

SACRAMENTO:
STATE OFFICE, : : : : : P. L. SHOAFF, SUPT. STATE PRINTING.
1887.

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To his Excellency George Stoneman, *Governor, and to the honorable the Senate and Assembly of the State of California:*

In accordance with the Act of the Legislature approved March 13, 1883, we, the State Board of Horticulture, respectfully submit our biennial report for the years 1885–1886.

By ELLWOOD COOPER, President.

A. H. Webb, Secretary.

December 31, 1886.

With profound regret we announce the demise of

COLONEL A. H. WEBB,

Our former Secretary.

B. M. Lelong has been appointed Secretary.

Mr. A. Scott Chapman has been commissioned to succeed Mr. Lelong on the Board.

By ELLWOOD COOPER, President.

OFFICERS AND MEMBERS OF THE BOARD.

Hon. ELLWOOD COOPER, President..............................Santa Barbara,
Commissioner for the Los Angeles District.

Rev. N. R. PECK, Vice-President..............................Penryn,
Commissioner for the El Dorado District.

Gen. M. G. VALLEJO, Treasurer..............................Sonoma,
Commissioner for the Sonoma District.

Dr. EDWIN KIMBALL, Auditor..............................Haywards,
Commissioner for the State at large.

A. Scott Chapman, San Gabriel..................Commissioner for the State at large.
Hon. H. C. Wilson, Red Bluff..................Commissioner for the Sacramento District.
W. M. Boggs, Napa City..................Commissioner for the Napa District.
W. M. Williams, Fresno..................Commissioner for the San Joaquin District.
Abram Block, Santa Clara..................Commissioner for the San Francisco District.

B. M. LELONG, Secretary.

W. G. KLEE, Inspector of Fruit Pests..............................Berkeley.

Office of the Board:
No. 220 Sutter Street, San Francisco.

TABLE OF CONTENTS.

	PAGE.
State laws, Act approved March 14, 1881	7
State laws, Act approved March 13, 1883	8
State laws, Act approved February 18, 1885	10
State laws, Act approved March 10, 1885	10
Report of State Inspector of Fruit Pests (Boggs)	12
Report of Treasurer for 1885	21
Report of Treasurer up to October 30, 1886	24
Pacific Coast Nurserymen's Association	26
Minutes of the Board, commencing April 1, 1885	28
Fifth annual State Convention (Los Angeles meeting)	32
Members of fifth annual State Convention	186
Sixth annual State Convention (Sacramento meeting)	187
Members of sixth annual State Convention	187
Reports, W. G. Klee, State Inspector of Fruit Pests	343
Reports of Secretary	424
Appendix	437
Proceedings of seventh Convention (Riverside meeting)	439
Fruit crop for past six years	511
California dried fruits, past four years	513
Proceedings State Board of Horticulture, 1886-7	565
Proceedings Executive Committee State Board of Horticulture	573
Library State Board of Horticulture	574
Index	577

CHAPTER LXXV.

An Act to protect and promote the horticultural interests of the State.

[Approved March 14, 1881.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1. Whenever a petition is presented to the Board of Supervisors of any county, and signed by five or more persons who are resident freeholders and possessors of an orchard, or both, stating that certain or all orchards, or nurseries, or trees of any variety, are infected with scale bug, codlin moth, or other insects that are destructive to trees, and praying that a commission be appointed by them, whose duty it shall be to supervise their destruction, as hereinafter provided, the Board of Supervisors shall, within twenty days thereafter, select three Commissioners for the county, to be known as the County Board of Horticultural Commissioners. The Board of Supervisors may fill any vacancy that may occur in said Commission, by death, resignation, or otherwise, and appoint one Commissioner each year, one month or thereabouts previous to the expiration of the term of office of any member of said Commission. The said Commissioners shall serve for a period of three years from the date of their appointment, except the Commissioners first appointed, one of whom shall serve for one year, one of whom shall serve for two years, and one of whom shall serve for three years, from the date of appointment. The Commissioners first appointed shall themselves decide, by lot, or otherwise, who shall serve for one year, who two years, and who three years, and shall notify the Board of Supervisors of the result of their choice.

Sec. 2. It shall be the duty of the County Board of Horticultural Commissioners in each county, whenever they shall be informed by complaint of any person residing in such county, that an orchard, or nursery, or trees, or any fruit packing house, storeroom, saleroom, or any other place in their jurisdiction, is infested with scale bug, codlin moth, red spider, or other noxious insect liable to spread contagion dangerous to the trees or fruit of complainant, or their eggs or larvæ, injurious to the fruit or fruit trees, they shall cause an inspection to be made of the said premises, and, if found infected, they shall notify the owner or owners, or the person or persons in charge or possession of the said trees, or places, as aforesaid, that the same are infected with said insects, or any of them, or their eggs or larvæ, and shall require such person or persons to disinfect the same within a certain time to be specified. If, within such specified time, such disinfection has not been accomplished, the said person or persons shall be required to make application of such treatment for the purpose of destroying them as said Commissioners shall prescribe. Said notices may be served upon the person or persons owning or having charge or possession of such infested trees, or places, or articles, as aforesaid, by any Commissioner, or by any person deputed by the said Commissioners for that purpose, or they may be served the same way as a summons in a civil action. If the owner or owners, or the person or persons in charge or possession of any orchard, or nursery, or trees, or places, or articles, infested with said insects, or any of them, or their larvæ or eggs, after having been notified as above to make application of treatment as directed, shall fail, neglect, or refuse so to do, he or they shall be deemed guilty of maintaining a public nuisance, and any such orchards, nurseries, trees, or places, or articles thus infested, shall be adjudged, and the same is hereby declared a public nuisance, and may be proceeded against as such. If found guilty, the Court shall direct the aforesaid County Board of Horticultural Commissioners to abate the nuisance. The expenses thus incurred shall be a lien upon the real property of the defendant.

Sec. 3. Said County Board of Horticultural Commissioners shall have power to divide the county into districts, and to appoint a local Inspector for each of said districts. The duties of such local Inspectors shall be prescribed by said County Board.

Sec. 4. It shall be the duty of the County Board of Commissioners to keep a record of their official doings, and to make a report to the Board of State Viticultural Commissioners on or before the first day of November of each year, who shall incorporate the same in their annual reports.

Sec. 5. It shall be the duty of the Commissioners at large, appointed by the Board of State Viticultural Commissioners for such purpose, to recommend, consult, and act with the County Boards of Commissioners, in their respective counties, as to the most efficacious treatment to be adopted for the extermination of the aforesaid insects, or larvæ, or eggs thereof, and to attend to such other duties as may be necessary to accomplish or carry out the full intent and meaning of this Act.

Sec. 6. Each County Commissioner and local Inspector may be paid five dollars for each day actually engaged in the performance of his duties under this Act, payable out of the County Treasury of his county; *provided*, that no more shall be paid for such services than shall be determined by resolution of the Board of Supervisors of the county for services actually and necessarily rendered.

Sec. 7. Each of said Commissioners may select one or more persons, without pay, to assist him in the discharge of his duties, as he may deem necessary.

Sec. 8. If any County Board of Commissioners, after having received complaint in writing, as provided for in section two of this Act, shall fail to perform the duties of their office, as required by this Act, they may be removed from office by the Board of Supervisors, and the vacancy thus formed shall be filled in the same manner as provided for in this Act.

Sec. 9. Nothing in this Act shall be construed so as to affect vineyards or their products.

Sec. 10. This Act shall take effect immediately.

CHAPTER LXIII.

An Act to create and establish a State Board of Horticulture, and appropriate money for the expenses thereof.

[Approved March 13, 1883.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1. There shall be a State Board of Horticulture, consisting of nine members, who shall be appointed by the Governor; two from the State at large, and one from each of the seven horticultural districts, which are hereby constituted as follows:

First—The Sonoma District, which shall include the Counties of Sonoma, Marin, Lake, Mendocino, Humboldt, Del Norte, Trinity, and Siskiyou.

Second—The Napa District, which shall include the Counties of Napa, Solano, and Contra Costa.

Third—The San Francisco District, which shall include the City and County of San Francisco, and the Counties of San Mateo, Alameda, Santa Clara, Santa Cruz, San Benito, and Monterey.

Fourth—The Los Angeles District, which shall include the Counties of Los Angeles, Ventura, Santa Barbara, San Luis Obispo, San Bernardino, and San Diego.

Fifth—The Sacramento District, which shall include the Counties of Sacramento, Yolo, Sutter, Colusa, Butte, Tehama, and Shasta.

Sixth—The San Joaquin District, which shall include the Counties of San Joaquin, Stanislaus, Merced, Fresno, Tulare, and Kern.

Seventh—The El Dorado District, which shall include the Counties of El Dorado, Amador, Calaveras, Tuolumne, Mariposa, Placer, Nevada, Yuba, Sierra, Plumas, Lassen, Modoc, Alpine, Mono, and Inyo.

Sec. 2. The members appointed from each district shall be residents of the district from which they are appointed, and shall be specially qualified by practical experience and study in connection with the industries dependent upon horticulture. They shall each hold office for the term of four years, except that of the nine first appointed, four, to be determined by lot, shall retire at the end of two years, when their successors shall be appointed by the Governor.

Sec. 3. The Board shall appoint and prescribe the duties of a Secretary, who shall not be one of their number, and elect of their own number a Treasurer, both to hold office during the pleasure of the said Board. The Treasurer shall give a bond to the State, with sureties approved by the said Board, in the sum of ten thousand dollars, for the faithful discharge of his duties.

Sec. 4. The Board may receive, manage, use, and hold donations and bequests for promoting the objects of its formation. It shall meet semi-annually, and as much oftener, and at such places, as it may deem expedient, to consult and adopt such measures as may best promote the horticultural industries of the State. It may, but without expense to the State, select and appoint competent and qualified persons to lecture in each of the horticultural districts named in section one of this Act, for the purpose of illustrating practical horticultural topics, and imparting instruction in the methods of culture, pruning, fertilizing, and also in the best methods of treating the diseases of fruit and fruit trees, cleansing orchards, and exterminating insect pests. The office of the Board shall be kept open to the public, subject to the rules of the Board, every day, excepting legal holidays, and shall be in charge of the Secretary during the absence of the Board.

Sec. 5. For the purpose of preventing the spread of contagious disease among fruit and fruit trees, and for the prevention, treatment, cure, and extirpation of fruit pests and the diseases of fruit and fruit trees, and for the disinfection of grafts, scions, orchard debris, empty fruit boxes and packages, and other suspected material or transportable articles, dangerous to orchards, fruit, and fruit trees, said Board shall make regulations for the inspection and disinfection thereof, which said regulations shall be circulated in printed form by the Board among the fruit growers and fruit dealers of the State, shall be published at least twenty days in two daily newspapers of general circulation in the State not of the same city or county, and shall be posted in three conspicuous places in each county in the State, one of which shall be at the County Court House thereof. Such regulations when so posted shall be held to impart notice of their contents to all persons within this State, and shall be binding upon all persons.

Sec. 6. The said Board shall elect of their own number, or appoint from without their number, a competent person especially qualified by practical experience in horticulture, for the duties of his office, who shall be known as Inspector of Fruit Pests (to hold office at the pleasure of the Board), whose duty it shall be to visit the horticultural districts of the State, to see that all regulations of said Board and provisions of law to prevent the spread of fruit pests and diseases of trees and plants injurious to the horticultural interests of the State, and all regulations of said Board in the nature of quarantining infected or infested districts, and also all rules and regulations of said Board concerning disinfection of fruits, trees, plants, grafts, scions, orchard debris, empty fruit boxes and packages, and other material dangerous to orchards, fruit, and fruit trees are enforced. He shall, also, whenever required, and under the direction of the Board, and may also upon his own motion, and upon the complaint of interested parties, inspect orchards, nurseries, and other places suspected, or believed to be infested with fruit pests, or infected with contagious disease injurious to trees, plants, or fruits, and he shall report the facts to said Board. If, upon report of said Inspector, or from well attested facts otherwise before it, said Board shall be of the opinion that any locality, orchard, district, or place is infested with fruit pests, or infected with contagious disease injurious to trees, plants, or fruits, and liable to spread to other localities to the injury of other persons or places, said Board shall by an order entered upon its minutes, so declare, said and such infested or infected district or place shall be under the quarantine regulations of said Board. As soon, however, as in the opinion of said Inspector the danger from such locality has ceased, he may suspend said quarantine regulations, and shall immediately report the fact to the Board, who may approve or disapprove his action. He shall from time to time, and whenever required by said Board, report to it such information as he may acquire from observation, experience, and otherwise, as to the best modes of diminishing and eradicating fruit pests and diseases from orchards; and also suggestions in practical horticulture; the adaptation of products to soil, climate, and markets, and such other facts and information as shall be calculated to improve the horticultural interests of the State.

Sec. 7. The said Board, and, in case of necessity, during the recess of the Board, the said Inspector may appoint such quarantine guardians as may be needed to carry out the provisions of this Act, whose duties it shall be to see that the regulations of the Board and the instructions of the Inspector are enforced and carried out; they shall also report to said Inspector, or to the State Board, all infractions or violations of said directions, regulations, and of the law in regard to quarantine disinfection and destruction of pests, and precautions against the spreading pests and diseases. The salary of quarantine guardians shall not exceed two dollars per day, and shall be paid by the owners of orchards and other places and localities under quarantine regulations; and they may maintain an action therefor before any Justice of the Peace in any township in which any quarantined locality is wholly or in part situated. But in no case shall they have any claim upon the State for such services.

Sec. 8. It shall be the duty of the Secretary to attend all meetings of the Board, and to preserve records of its proceedings and correspondence; to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agriculture and horticulture societies, colleges, and schools of agriculture and horticulture, and other persons and bodies, as he may be directed by the Board, and prepare, as required by the Board, reports for publication; he shall also act as assistant to and obey the directions of the Inspector of Fruit Pests in the exercise of the duties of his office, and shall be paid for his services as such Secretary and assistant a salary of not to exceed seventy-five dollars per month.

Sec. 9. The Inspector of Fruit Pests shall receive as compensation for his services not to exceed the sum of one hundred and fifty dollars per month, and his actual traveling expenses shall be allowed, not to exceed seven hundred and fifty dollars per annum; the other members of the said Board shall receive no compensation whatever.

Sec. 10. The Board shall biennially, in the month of January, report to the Legislature a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and Secretary. Said report shall not exceed one hundred printed pages.

Sec. 11. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by it, and shall annually render a detailed account to the Board.

Sec. 12. There is hereby appropriated for the uses of the State Board of Horticulture, as set forth in this Act, out of any moneys in the State Treasury not otherwise appropriated, the sum of five thousand dollars for the year commencing April first, one thousand eight hundred and eighty-three, and five thousand dollars for the year commencing April first, one thousand eight hundred and eighty-four, and the State Controller will draw his warrants upon the State Treasurer in favor of the Treasurer of said Board for the said sums, or any part thereof, when they become available, upon proper demand being made for the same by the said Board.

Sec. 13. This Act shall take effect and be in force from and after its passage, and all Acts or parts of Acts inconsistent or in conflict with the provisions of this Act are hereby repealed.

CHAPTER VII.

An Act to amend sections eight, nine, ten, eleven, and twelve of an Act entitled "An Act to create and establish a State Board of Horticulture, and appropriate money for the expenses thereof," approved March thirteenth, eighteen hundred and eighty-three.

[Approved February 18, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section eight of said Act is hereby amended to read as follows:

Section 8. It shall be the duty of the Secretary to attend all meetings of the Board, and to preserve records of its proceedings and correspondence; to collect books, pamphlets, and periodicals, and other documents containing valuable information relating to horticulture, and to preserve the same; to collect statistics and other information showing the actual condition and progress of horticulture in this State and elsewhere; to correspond with agricultural and horticultural societies, colleges, and schools of agriculture and horticulture, and other persons and bodies, as he may be directed by the Board, and prepare, as required by the Board, reports for publication. He shall also act as assistant to and obey the directions of the Inspector of Fruit Pests in the exercise of the duties of his office, and shall be paid for his services as such Secretary and assistant a salary of one hundred and fifty dollars per month, to be paid as other State officers.

SEC. 2. Section nine of said Act is hereby amended to read as follows:

Section 9. The Inspector of Fruit Pests shall receive as compensation for his services the sum of two hundred dollars per month, to be paid as other State officers, and his actual traveling expenses shall be allowed, not to exceed one thousand dollars per annum. The members of the Board and Secretary shall receive their actual traveling expenses in attending semi-annual meetings of the Board.

SEC. 3. Section ten of said Act is hereby amended to read as follows:

Section 10. The Board shall, biennially, in the month of January, report to the Legislature a statement of its doings, with a copy of the Treasurer's accounts for the two years preceding the session thereof, and abstracts of the reports of the Inspector of Fruit Pests and Secretary.

SEC. 4. Section eleven is hereby amended to read as follows:

Section 11. The Treasurer shall receive all moneys belonging to the Board, and pay out the same only for bills approved by the Chairman of the Finance Committee, and shall annually render a detailed account to the Board.

SEC. 5. Section 12. There is hereby appropriated, for the uses of the State Board of Horticulture, as set forth in this Act, out of any moneys in the State Treasury not otherwise appropriated, the sum of ten thousand dollars for the year commencing April first, one thousand eight hundred and eighty-five, and ten thousand dollars for the year commencing April first, one thousand eight hundred and eighty-six, and the State Controller will draw his warrants upon the State Treasurer in favor of the Treasurer of said Board for the said sums, or any part thereof, when they become available, upon proper demand being made for the same by the said Board.

SEC. 6. This Act shall take effect immediately.

CHAPTER XXXVI.

An Act to prevent the spreading of fruit and fruit tree pests and diseases, and to provide for their extirpation.

[Approved March 10, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be the duty of every owner, possessor, or occupier of an orchard, nursery, or land where fruit trees are grown within this State, to disinfect all fruit trees grown on such lands infested with any insect or insects, or the germs thereof, or infested by any contagious disease known to be injurious to fruit or fruit trees, before the removal of the same from such premises for sale, gift, distribution, or transportation. Fruit boxes which have been used for shipping fruit to any destination are hereby required to be disinfected previous to their being again used for any purpose; all boxes returned to any orchard, storeroom, salesroom, or any place used or to be used for storage, shipping, or any other purpose, must be disinfected within three days after their return; and any and all persons failing to comply with the requirements of this section shall be guilty of a misdemeanor. All packages, known as free packages, must be destroyed or disinfected before being again used.

SEC. 2. It shall be the duty of the owner, lessee, or occupier of any orchard within this State, to gather all fruit infested by the insects known as the codlin moth, peach moth, red spider, plum weevil, and kindred noxious insects, their larvæ or pupæ, which has fallen from the tree or trees, as often as once a week, and dispose of or destroy the same in such a manner as to effectually destroy all such insects, their larvæ or pupæ. It shall be the duty of the Inspector of Fruit Pests, or the Quarantine Guardian, to inspect fruit packages, and all trees and plants, cuttings, grafts, and scions, known or believed to be infested by any insect or insects, or the germs thereof, or their eggs, larvæ, or pupæ, injurious to fruit or fruit trees, or infested with any disease liable to spread contagion, imported or brought into this State from any foreign country, or from any of the United States or Territories, and if, upon inspection, such fruit, or fruit packages, are found to be infested or infected, it shall be a misdemeanor to offer the same for sale, gift, distribution, or transportation, unless they shall be first disinfected.

Sec. 3. Every person shipping fruit trees, scions, cuttings, or plants, from any orchard, nursery, or other place where they were grown or produced, shall place upon or securely attach to each box, package, or parcel containing such fruit trees, scions, cuttings, or plants, a distinct mark or label, showing the name of the owner or shipper, and the locality where produced. And any person who shall cause to be shipped, transported, or removed from any locality declared by the State Board of Horticulture to be infested with fruit tree or orchard pests, or infected with contagious diseases injurious to trees, plants, or fruits, unless the same shall have been previously disinfected, shall be guilty of a misdemeanor. Disinfection shall be to the satisfaction of the State Board of Horticulture, or the Inspector of Fruit Pests. When disinfected, the fact shall be stamped upon each box, package, or separate parcel of fruit trees, scions, cuttings, or plants; and any person who shall cause to be shipped, transported, or removed, any such box, parcel, or package, from any quarantine district or locality, not bearing such stamp, shall be guilty of a misdemeanor, and may be punished by a fine, as provided in section six of this Act. Any person who shall falsely cause such stamp to be used, or shall imitate or counterfeit any stamp or device used for such purpose, shall be guilty of a misdemeanor.

Sec. 4. It shall be the special duty of each member of the State Board of Horticulture to see that the provisions of this Act are carried out within his respective horticultural district, and all offenders duly punished.

Sec. 5. All fruit trees infested by any insect or insects, their germs, larvæ, or pupæ, or infected by disease known to be injurious to fruit, or fruit trees, and liable to spread contagion, must be cleaned or disinfected before the first day of April, eighteen hundred and eighty-five, and on or before the first day of April of every succeeding year thereafter. All owners or occupants of lands on which fruit trees are grown failing to comply with the provisions of this section, shall be guilty of a misdemeanor, and fined as provided for in section six of this Act. All fruit, packages, trees, plants, cuttings, grafts, and scions, that shall not be disinfected within twenty-four hours after notice by the Inspector of Fruit Pests, or a duly appointed Quarantine Guardian, or any member of the Board of Horticulture, shall be liable to be proceeded against as a public nuisance.

Sec. 6. Any person or corporation violating any of the provisions of this Act, shall be deemed guilty of a misdemeanor, and shall, on conviction thereof, be punishable by a fine of not less than twenty-five dollars nor more than one hundred dollars for every offense.

REPORT OF W. M. BOGGS, STATE INSPECTOR OF FRUIT PESTS, UP TO APRIL 15, 1886.

REMEDIES FOR VARIOUS PESTS.

The best remedy for the pear-leaf caterpillar, which is a small, green worm that eats the leaf through, and has caused great damage in some orchards, is tobacco stems and leaves boiled down strong, and the liquor mixed with thirty pounds of whale-oil soap, ten pounds of best sulphur, three pounds of concentrated lye, and all this with one hundred gallons of hot water. This can be sprayed over the trees a number of times. For the destruction of the caterpillar of the sawfly, and for the codlin moth, I would refer the fruit growers to Dr. Chapin's report, on page 25, biennial report of State Board of Horticulture of 1884.

The bovers, and the different aphides and woolly aphis, do not seem so bad this season as the last; at least I have not observed them as yet in my travels.

For red spider I would refer to the same report of Dr. Chapin, on page 27. Dr. Chapin recommends in this report the following: Whale-oil soap and sulphur mixture, three pounds; fluid extract tobacco, two pints; fluid extract of buhach, two ounces; hot water, five and one half gallons. Mixing and using hot this may be applied now and then in the spring. For autumn wash, see same report and suggestions made by Dr. Chapin on various pests; also, to report of Hon. Ellwood Cooper on scale pests and his remedies therefor.

SCALE INSECTS.

Reports come in rapidly from various sections of the State of the appearance of the San José scale, even so far north as Geyserville, in Sonoma County, Healdsburg and vicinity, and some of the northern Sacramento counties, but I had no report from Vacaville or vicinity concerning the scale, and it is to be hoped that the extensive fruit-growing district of Pleasant Valley and Putah River will escape the ravages of this pest. I found but little, if any, in the orchards of Napa County, with one exception only. Judge Stanly's young orchards, at Carneros, near Suscol, had been badly infested with scale, and his older trees were so badly infected that he had them lopped off near the forks, and the trunks washed with a strong solution, so as to effectually kill the scale and save the trees, which were in rich soil and of thrifty growth. His young pear and apple orchards were thoroughly disinfected. Whenever attention and labor has been bestowed on the trees the scale was overcome. The orchards and vineyards of Judge Stanly are surrounded by heavy belts of eucalyptus trees, protecting them from the prevailing winds and frost. The Judge has fully demonstrated the fact of the protection afforded his young trees and vines by these heavy belts of eucalyptus, by comparing results with his neighbors who were unprotected. Some of his borders of trees were from twenty-five to fifty trees in depth or width, affording a complete barrier to strong winds and warding off biting frosts.

In regard to the citrus fruits and their pests, it may be said that they more properly belong to the southern part of this State. While I would not discourage any one from planting the orange in the northern portion of the State, in well sheltered localities, or in the warmer climate of the Upper Sacramento, yet I would not wish to deceive any by saying that the orange is a fruit well adapted to our northern valleys. For the eradication of the citrus fruit pests the same remedies are not used by all citrus-tree growers, and the same reference is hereby made to the discussions in the Los Angeles convention in relation thereto by the orange growers themselves. One simple remedy, however, the effects of which we had the pleasure of witnessing, was that used by Don Antonio F. Coronel, of Los Angeles, on his grove of orange trees. The ingredients used were ten pounds of whale-oil soap to forty gallons of water, with a half gallon of tar added, boiled together and applied hot, as high as 130°. This simple remedy cleansed the trees of all pests. It was applied in December or January with good effect, as witnessed by a number of the State Board of Horticulture, who where in Los Angeles at the time in attendance on the State Fruit Growers' Convention.

THE OLIVE.

Although many young olive trees have been planted in the northern part of the State, in Sonoma and other northern districts, yet they have not arrived at a bearing condition, consequently the pest that is particularly bad on that fruit is not yet observable on the young trees in Northern California. A quotation from the report of Hon. Ellwood Cooper, December 17, 1884, to the State Board of Horticulture, would not be out of place here. Mr. Cooper says:

> The olive is a rapid grower, and bears abundant crops; it would seem to be the tree, of all others, that should claim the attention of the people, and its planting be encouraged. There is, however, much yet to learn to enable the grower to keep his trees from the black scale. No other tree seems to yield so readily to the attack. The increase is so rapid, and the insect is so persistent, that it is yet a question whether, in large areas, closely planted, it can be kept in check at a cost that the fruit will warrant.

Mr. Cooper is doubtless the best authority in the State on the culture of the olive and the manufacturing of olive oil. Louis Figuier, an eminent French entomologist, in his description of the insect world, describes one of the greatest of olive pests, called the "olive Dacus," *Dacus olaæ*, a little fly, about half the size of a house fly, of ashy gray color on the back, its head orange yellow, its eyes green, and its forehead yellow marked with two large black spots. The thorax is adorned with four lightish yellow spots, and its hind parts, as well as its antennæ and wings, are of the same color. This learned author says that this is a destructive insect, a perfect scourge, which causes every two or three years a loss of five or six millions of francs to French agriculture. Another French author, M. Guerin Meneville, quoted in the same work, has made some valuable observations on the "olive Dacus," and at the request of the Imperial Society of Agriculture at Paris, has indicated the way to preserve the olive from these ruinous larvæ, which generally destroy two crops out of three. We will borrow the details from this learned entomologist:

> At the time when the olives are formed the Dacus proceeds to place an egg under the skin of each of the fruits. By means of a little horny instrument with which the female is provided, and which contains a small lancet, she pierces the skin of the olive. She moves her wings and lays her egg; she afterwards cleans and rests herself by passing her feet over her head and wings and other parts of her body. She then flies away, and seeks another olive to deposit in it another egg. She repeats this operation until she has placed on as many olives the three or four hundred eggs she bears.

This learned French author continues to give a minute description of the larva and the process it passes through before it becomes mature for mischief. Besides, he says, the species of insects in the warm climate of Provence and Italy can reproduce itself several times from the beginning of July, the period at which the first flies begin to lay, till the end of autumn. For a more definite description on this subject I would refer to the work on Olive Culture by our worthy Chairman, Hon. Ellwood Cooper, page 9. No better authority on the olive can be consulted in this State. Mr. Cooper has informed me that the washes in common use for the destruction of the scale pests on deciduous trees are entirely too strong for the orange and the olive, consequently the greatest care should be exercised in using all washes.

CALIFORNIA ORCHARDS.

It would be superfluous in me at this time to enter into a more extended report of the condition of the orchards and fruit interests of this State, as the many meetings of horticultural societies and fruit growers' conventions recently held at regular intervals, and the discussions therein by the leading horticulturists on the variously arranged subjects, have flooded the press and periodicals with full and ample information on all subjects relating to the fruit interests of this State. Much valuable information has been given the public through the labors of the State Board of Horticulture, by calling and holding conventions and appropriating means for defraying the expenses attendant on these important meetings of the fruit growers from the different sections of the State, thus giving them a full opportunity to confer with each other. They are given a chance to compare their experiences, and to discuss the best ways and means of disposing of their fruits, the best varieties to cultivate, the manner of packing and shipping, creating market for them, the methods of destroying the fruit pests of their orchards; in fact, everything connected with the fruit growers' interest. All these are embodied in book form and distributed throughout the State for the general information of the public. In my travels through the various fruit districts, I have invariably solicited the names of parties to whom we would address the various reports and publications, furnished by the State Board through the Secretary. Large packages in many instances were forwarded to certain important localities for distribution. This has been done until the supplies that were furnished by the State were exhausted. My predecessor, Dr. Chapin, gave a very extended report on the conditions and circumstances connected with the general interest of fruit growing, and also gave much valuable information to the public in his report as published in the biennial report of the State Board of Horticulture in 1884, which publication also contains the report of the Fourth Annual Fruit Growers' Convention, in part, and the full stenographic report was published in the "Rural Press," by authority of the State Board of Horticulture. The full and complete discussion on every topic connected with horticulture in this convention, and the more recent convention held at Los Angeles, which was also published by authority of the State Board in the "Rural Press," embraces nearly if not everything that could be of any interest to the fruit growers of this State, or to any one contemplating entering into the business. The question of insecticides and the various pests were most thoroughly discussed in the Los Angeles convention, and I most cheerfully recommend every one seeking information on those particular subjects to procure the "Rural Press" and read the debates on those subjects. More valuable information can be obtained by reading those reports and discussions than can be obtained in any other manner, as the arguments pro and con on certain remedies used and experiments performed, and mistakes discovered and corrected, brought out more light on the different subjects under discussion than all the books one could read. The subject of fruit pests is becoming better understood, as the ingredients and apparatus for their destruction are becoming more convenient and more generally applied. The spraying apparatus used at Santa Clara and San José is about the best in use. Pumps and tanks, filled with the solution or insecticide, are mounted on sleds, and spraying hose and nozzle attached and hauled through the orchards and nurseries several times during the spraying season. This procedure proves effectual in every instance where the proper ingredients are applied, but it requires labor, and without labor nothing is accomplished. Trees that have overborne with fruit and apparently become exhausted are easily restored to vigorous growth and recuperated by a plentiful application of half rotted ashes about the base of the tree. Soap washes and scraping down the old bark is also resorted to with success. Caustic soda, American potash, whale-oil soap, concentrated lye, sulphur, and kerosene oil have been recommended for use as ingredients for the various washes. I applied pure kerosene oil to old apple trees for the "woolly aphis" with success, simply by dipping a brush in a basin of the oil and rubbing it on the trunk and main branches of the tree. This was done in January. The trees were badly infested with the aphis, and now not one is to be seen, and the bark has a smooth, healthy look, and the trees full of bloom. Pure kerosene oil has been used with success upon ten-year old pear and apple trees for the destruction of the scale, "*Aspidiotus perniciosus*," or San José scale.

RESTORING OLD TREES.

One of the very best methods of restoring old trees or orchards is to lop off the top or main limbs and graft them with other fruit. Especially is this notable with old almond trees and pear trees, as well as apple. Rapid and vigorous growth is made in the oldest pear tree and almond trees. Almond trees twenty years old have made fine growth by grafting them with the prune. They become excellent bearers. This is specially noted in the "Oak Knoll" orchards of Drury Melone, Esq., Napa County. He showed prune trees that were grafted into the old almond stumps that produced more fruit and better quality than any other trees in his orchards. Some of the trunks were a foot and over in diameter. These "Oak Knoll" orchards are among the oldest in the State, and, under the present management of Mr. Melone, the entire estate seems to have undergone a great change. Mr. Melone is taking an active and energetic part in all matters pertaining to the fruit interest of the State. He informs me that the prospects are fine for a good fruit crop this year at the "Oak Knoll" orchards.

CONCLUSION ON SCALES.

I cannot close this report without referring to a communication I received from our worthy President, Mr. Ellwood Cooper, in regard to certain washes that he considers too strong for the orange and olive trees. Concentrated lye, one pound to the gallon of water, he considers entirely too strong and too expensive for use. He says that he commenced washing trees nine years ago with whale-oil soap, which is a good thing and cheap. He mixed tobacco decoction with it. Kerosene oil, 150 fine test, is the best insect destroyer, but requires the greatest care in using. All the washes require care. He has used more washes, and more extensively, than any other man in California, and has tried almost everything. Matthew Cooke says that no orchardist will use kerosene in any form, yet here we have one of the most experienced and intelligent horticulturists in the State recommending its use with care. I know that it has been used in Fresno with success, in one instance; and I have used it on old apple trees for the aphis with success, without injury to the tree or fruit.

PEACH MOTH (*Anarsia Lineatella*).

The peach orchards of Berryessa Valley, in Napa County, have been badly infested with this pest. The farmers do not seem to know anything about it. Mr. John Smittle, a prominent citizen and ex-Supervisor, has informed me of the condition of the peach trees on his premises, and says that all the peach trees in that valley are similarly affected. From his description it undoubtedly is the peach moth, *Anarsia Lineatella*, described by Dr. Chapin in his biennial report, as Inspector of Fruit Pests, 1884, page 39.

Since writing the foregoing account another report comes from Vacaville, Solano County, of the destruction of the peach crop and injury to some trees in that vicinity. It is attributed to the rapid growth in early spring, and the sudden change of damp to hot, dry, north winds drying up and souring of the sap in the trees, causing them to dry up and wither. This may also be the cause of the failure of the peach crop in Berryessa Valley, as the climate and latitude is about the same as Pleasant Valley or Vacaville. The report says that fifteen hundred peach trees have died in the vicinity of Vacaville. The death of the trees is accounted for by the statement that the warm spell, about six weeks ago, started a vigorous flow of sap in the trees, which was soured by subsequent cold, dry weather and north wind, and the wet, cold condition of the ground had its effect also. The "curl" on the peach trees is attributable to a like cause. This early putting forth of the leaf in warm spells of weather in early spring, and a sudden change from warm to a cold and biting spell, with some frost, chills the young and tender leaves, causing them to crisp up and grow out of shape. Shaking the tree occasionally, and splitting the bark by drawing your knife up and down the trunk and main branches, sometimes proves beneficial, if not causing the tree to recover its natural health altogether.

CITRUS FRUIT PESTS.

This report does not extend to the southern counties; as far as Los Angeles and San Diego Counties are concerned the fruit growers of those southern counties are fully alive to the work of destroying the pests, more so than any other part of the State perhaps, San José and Santa Clara excepted. The unexpected change in the time of our regular meeting prevents me from giving a more extended report over other and large fruit districts at this time, especially as relates to the citrus-growing districts of the southern counties. The fine young orchards of Contra Costa County are deserving a more extended notice in this report, especially the fine orchard of Gen. Wagner, in San Pablo Valley. It consists of nine thousand trees in a flourishing condition and just coming into bearing. The General is the most thoroughly practical and scientific man I have yet found engaged in fruit culture. He has made a successful combat against the pests of his orchards.

ANNUAL REPORT OF THE COMMISSIONER

OF THE SECOND HORTICULTURAL DISTRICT OF THE STATE OF CALIFORNIA, COMPRISING THE COUNTIES OF NAPA, SOLANO, AND CONTRA COSTA.

To the honorable State Board of Horticulture of the State of California:

In making a report from the Second Horticultural District of the State, I beg leave to offer the following suggestions to those engaged in horticultural pursuits, or to those about to engage in those pursuits, either as a source of profit, or for their own pleasure and personal use; or I might say for home consumption. From past experience of over forty years as an observer of the products of the soils of California, and its adaptability to the various fruits especially now raised by the orchardists for market, I find too great a variety planted in a majority of instances, so much so as to prevent the success of the orchardist from realizing a profit on his investment. Instead of a few select and hardy varieties, comprising the choicest of apple, pear, peach, or plum, or apricot, orchardists in common nearly all go on the principle that all fruit is good so that it is marketable, so that so many boxes can be shipped and so much weight obtained—an error that the more intelligent and close observer of the markets has long since discovered, and who very sensibly improves the opportunity, and proceeds to select with care from the nursery the best varieties that possibly can be obtained, and consequently he has a ready demand for every box of fruit produced from his carefully selected stock. But this to the old orchardist may seem somewhat stale as a suggestion, but in this State, just developing into the greatest fruit-producing region on the face of the globe, there are many thousands of persons that are just as inexperienced in the horticultural pursuits of the present day as our forefathers were centuries ago, and practical hints which seem old to the experienced orchardist are essential and necessary to those who are about to enter for the first time into this important and growing industry of the State. In reference to the care and cultivation of fruit trees, I would respectfully refer the seeker after information on this subject to the various horticultural reports of the State Board of Horticultural Commissioners, especially those of 1883–84–85, and to the forthcoming reports of 1886. On the subject of pruning or training of the young fruit tree, I would call especial attention to the remarks of Mr. Jessup, on pages 120 and 121, annual report of the State Board of Horticulture of California for the year 1883. In referring to Mr. Jessup, it would be as well to state that he was a man of vast practical experience, personally thoroughly imbued with enthusiasm in the interest of horticulture of this, his adopted State; so much so that he sacrificed his life in the promotion of the horticultural interest of this State by exposing himself night and day at the great Orleans World's Exposition. It was the good fortune of the writer to have known him in his lifetime, and I must say that I never met a man that was more devoted to the pursuits that he had chosen for his lifetime occupation—a practical fruit grower.

By referring to the debates in the various conventions of fruit growers held under the auspices of the State Board of Horticulture of this State, every subject connected with horticulture and horticultural interests can be studied with advantage. These reports are always attainable by applying to the Secretary of the State Board of Horticulture, whose duty is to forward them to any parties who may desire them. A very large portion of the Second Horticultural District more properly belongs to a viticultural commissioner's report than a horticultural report. The great wine growing interest of Napa County alone has already, with its rapid advancement in viticulture, amounted away up into the millions; some individual cellars having invested in fixtures and cellar accommodations alone as much as a quarter of a million of dollars. Added to this the capacity and the storage of several millions of gallons of pure wine annually, with an increasing vintage from year to year—even ascending to the steep mountain sides and roughest stony and brush-covered chemisal lands for space and soil adapted to the growth of the vine. And this great staple product, which is fast becoming the leading interest of the State, is attracting the capitalists of Europe, who are pouring into our Golden State with their millions to invest in our lands and fruit and wine interests.

I shall always remember a remark made by an aged and intelligent old mechanic who was here in 1846—when the first overland emigrants arrived on this coast from the Western States. Some of them were greatly disappointed in the appearance of these bleak and dry looking hills and plains, and spoke disparagingly of the country. The old gentleman said the time would come when the three great staple articles of production on this coast would be *wine*, *wool*, and *wheat*, and that *wine* would be the greatest of the three. What man who has passed up through the great vineyards of Napa County, and through the cellars of Anduran & Co., at Napa City, Groyenger's of Yountville, Hastings, Crabb, and others of Oakville, Nebaum and others of Rutherford, Crugh, Berringer, and Schram of St. Helena, but will at once acknowledge the truthfulness of the prophetic vision of the old pioneer of 1846? But the old gentleman might have added another great interest besides the wine-growing interest, in the horticultural or fruit interest.

No part of the world has made more rapid strides in her horticultural pursuits than California. Looking at the great valleys of Santa Clara and San José, with their thousands of acres of flourishing orchards, and her great nurseries of hundreds of acres of choice trees distributing millions of trees annually all over the State, well might she be considered the great tree-distributing center of the State. Fresno, also, with her thousands of acres producing all kinds of fruits and flowers, citrus fruits, and deciduous fruits, ornamental, and new varieties of fruits from her "semi-tropical" nurseries. No part of the State can excel Fresno in the rapid growth of trees and the productiveness of her soils. The orange, the lemon, and the fig all grow to enormous size, and it is not uncommon to see trees of two and three years growth from six to eight inches in diameter. Her raisin vineyards are bidding fair to outrival the great Malaga raisins of Spain or France. The same may be said of many other portions of the State, but the special attention of your Commission was called to these particular places while on a tour of official inspection as Inspector of Fruit Pests throughout the State.

There can be no greater field for those interested in the pursuits of horticulture in any of its various branches than is afforded by the vast and fertile plains and valleys of the southern and middle counties of our State, and as far north as Shasta. The great orchards of General Bidwell, the pioneer farmer and king of orchardists at Chico, with his fertile domain of twenty-two thousand acres intact—orchard of thirteen hundred acres, and four or five thousand acres devoted to the cereals and other products—there the orange, the lime, and the fig also flourishes side by side. And this enterprising and veteran pioneer orchardist knows no limit to the progress of his adopted State, being one of its founders. He has also founded a princely estate for himself, and to which he is justly entitled, for the State owes to such men as General John Bidwell, and men of his character, the present prosperity and greatness in the development of her soils and the greatness of her institutions kindred thereto.

Our State Fairs and District Fairs, our exhibits of astounding products of California's soil at our World's Exhibitions are largely the results of these pioneer tillers of the soil, at an early day when most men were seeking and delving after the precious metals. The names of such men as Sutter and Bidwell will be handed down to posterity with as lasting fame as some of our noblest heroes of past history. Let not the student of modern science smile at the grand old names mentioned; they were men of broad and intellectual views, looking far into the future of their adopted State. They began early to experiment and develop the great agricultural wealth of this empire of the Pacific Slope; they staked their all in turning up the soil and proving to the world that California could provide bread for the millions, and fruits of all kinds for the world's market. Our valleys and hillsides dotted from base to summit with orchards, our vineclad hills and vales covered over with the orange, the olive, the lime, the fig, the semi-tropical growth of which astonishes the world—all are the results of the early development of our soils by the far-seeing sagacious men who pioneered this coast, and have spent long and useful lives in the greatest of all industrial pursuits—the tillage of the soil.

Our fruits are now supplying some of the principal markets of the East; our canneries are shipping to Liverpool and other foreign markets. The little cannery of Napa City is already shipping her canned fruits to Liverpool, and one can see daily large truck loads of this canned goods in packages, stencil-marked "Liverpool," and other foreign markets, and yet it is only the beginning. The fruit interest of the State is only partly developed. The art of drying and packing and canning fruit is only in its infancy yet. This immense branch of industry yet to be is opening up a great field for the occupation of the youth of our land, who, notwithstanding the cry of "hoodlumism," possess rare and intelligent qualities befitting them to improve the present hour of thrift and prosperity and take unto themselves the learning of all that is useful, in the way of trades, and apply themselves to the great work of the advancement and prosperity of themselves, their State, and their own happiness.

The rapid increase of population in the rural districts of late years, and the constant arrival of intelligent foreigners to our shores, calls forth all the energy in our own race to keep pace with the times. The great want of practical knowledge how to prepare our fruits for the eastern and foreign markets is sorely felt, and much needed information how to dry and cure our prunes, our figs and raisins, and all other fruits, so as to compete with foreign importation, is wanted.

The State Board of Horticulture is doing all that they can do, with the limited appropriation at their command, to disseminate all useful information on all subjects pertaining to the interests of horticulture. The holding of fruit growers' conventions annually, under the management of the Board, and defraying the expenses thereof out of a meager appropriation made by the State; giving their services gratuitously for advancement and promotion of such interests, shows a commendable zeal that the State and those interested in fruit culture should be proud of. The annual report of the Secretary and Treasurer of the Board shows that the funds appropriated have been exceedingly carefully and economically disbursed, leaving a surplus over the amount appropriated for each year on hand.

The office of State Inspector of Fruit Pests is one of importance, and requires not only a man who possesses a knowledge of the various pests injurious to fruits, but it requires a man of energy and perseverance; and it has become a custom of the Board to vacate the office of Inspector, at the annual meetings or stated meetings of the Board, and elect a new man to the position; and I herewith recommend the changing of that officer as frequent as the exigencies of the case demands it should be done. The position of State Inspector of Fruit Pests should not become a mere sinecure to any man, but should be given to a live, energetic, qualified officer, who will devote his time and energies to the work and duties of the office. He should be required to make out a *monthly report to the Board, or to the Secretary's office*, which should be filed until the Board meets, to examine the work and see what is being done by an officer who draws the sum of $200 per month, and expenses to the amount of $1,000 per annum. The Secretary's office is one that requires a practical knowledge of the work and duties of that office; it should be filled by an experienced and careful officer.

The discussions on the various questions of interest in horticulture are often of great benefit to the general public, and should be embodied in the annual reports of the State Board of Horticulture. But the inconsistent remarks of the late chief horticultural officer under the old law, who says, in a former report in print, that kerosene or coal oil should not be used, or rather, in his own language, that no orchardist should use it in any form, and then, in his late speech to the present Fruit Growers' Convention, says it is one of the best remedies in use—changing his opinion to suit the times, as the same has been recommended and used with great success by some of the most practical horticulturists—such argument has a tendency to cause doubt in the minds of the fruit growers as to the efficacy of any remedy, and should not be printed.

I regret that important business prevents me from attending at this time so important a convention as is now assembled at Sacramento.

Very respectfully submitted.

W. M. BOGGS,

Commissioner for the Second Horticultural District of the State of California.

TREASURER'S ANNUAL REPORT,

ENDING MARCH 31, 1886.

To the President and Members of the State Board of Horticulture:

Gentlemen: I herewith submit to you this, my annual report of the financial transactions and condition of the State Board of Horticulture for the fiscal year ending March 31, 1886.

The following claims against this Board have been duly presented, approved, and warrants drawn by the Controller to cover the same, and paid by the State Treasurer, vouchers for all of which being on file in the office of the Board:

For Month of April, 1885.

Edward Denny & Co., for stationery	$17 10
Le Count Bros., for stationery	11 45
Mrs. L. G. Richmond & Son, for 1,200 wrappers to order	12 00
R. H. Follis, for rent of office	30 00
Charles Staples, for services as Janitor	5 00
S. F. Chapin, for traveling and other expenses as Inspector of Fruit Pests	52 05
A. H. Webb, for expenditures as Secretary	52 90
A. H. Webb, expenses (one day) in attending the semi-annual meeting of the Board on April 23, 1885	3 00
The following members in the sums set opposite their names, for expenses in attending the semi-annual meeting of the Board on April 23, 1885:	
General M. G. Vallejo	15 00
G. N. Milco	20 00
Wm. M. Boggs	13 00
N. R. Peck	17 60
A. F. Coronel	59 00
	$308 10

For Month of May, 1885.

Ellwood Cooper, for expenses as Commissioner in attending the semi-annual meeting of the Board, at San Francisco, on April 23, 1885	$44 00
A. H. Webb, for expenses as Secretary	25 20
S. F. Chapin, for expenses as Inspector, and supplies necessary in experimentation	112 88
R. H. Follis, for rent of office	30 00
N. P. Cole & Co., for office table	30 00
Charles Staples, for services as Janitor	5 00
	$247 08

For Month of June, 1885.

Wells, Fargo & Co., for expressage	$121 00
A. H. Webb, for expenditures as Secretary	19 65
S. F. Chapin, for expenses as Inspector	101 50
Charles Staples, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Edward Denny & Co., for stationery	5 50
	$282 65

For Month of July, 1885.

A. H. Webb, for expenditures as Secretary	$32 45
S. F. Chapin, for expenses as Inspector	33 20
William McDonald, services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Dr. W. H. Harkness, for books for office	25 00
A. Roman, for books for office	140 60
	$265 25

For Month of August, 1885.

A. H. Webb, for expenditures as Secretary	$12 05
S. F. Chapin, for expenses as Inspector	110 85
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Edward Denny & Co.	7 85
	$165 75

For Month of September, 1885.

A. H. Webb, for expenditures as Secretary	$7 00
S. F. Chapin, for expenses as Inspector	122 65
Wm. McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
	$164 65

For Month of October, 1885.

A. H. Webb, for expenditures as Secretary	$5 25
S. F. Chapin, for expenditures as Inspector	6 50
Wm. McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
	$46 75

For Month of November, 1885.

A. H. Webb, for expenditures as Secretary, including traveling expenses in attending semi-annual meeting of Board at Los Angeles in November, 1885	$80 00
S. F. Chapin, for expenses in attending semi-annual meeting of Board at Los Angeles in November, 1885	76 20
E. Kimball, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	75 25
Ellwood Cooper, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	49 60
H. C. Wilson, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	86 60
G. N. Milco, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	64 27
Wm. M. Boggs, for expenses in attending the semi-annual meeting of the Board at Los Angeles in November, 1885	80 12
Grand Opera House at Los Angeles, for use of building during fifth annual Convention at Los Angeles in November, 1885	189 95
A. K. Whitton, bill for reporting and transcribing proceedings of fifth annual Convention at Los Angeles in November, 1885	265 00
R. H. Follis, for rent of office	30 00
Wm. McDonald, for services as Janitor	5 00
	$1,001 99

For Month of December, 1885.

A. H. Webb, for expenses as Secretary	$10 80
William M. Boggs, for expenditures as Inspector	85 95
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Arthur M. Ebbetts, for coal	5 75
A. Roman, for books for office	10 50
Edward Denny & Co., for stationery	23 55
	$171 55

For Month of January, 1886.

A. H. Webb, for expenditures as Secretary	$20 35
William M. Boggs, for expenditures as Inspector	108 45
R. H. Follis, for rent of office	30 00
William McDonald, for services as Janitor	5 00
Hellman, Stassford & Co., for stationery at Fifth Annual Fruit Growers' Convention	11 40
	$175 20

For Month of February, 1886.

A. H. Webb, for expenditures as Secretary	$7 30
William M. Boggs, for expenditures as Inspector	38 05
R. H. Follis, for rent of office	30 00
William McDonald for services as Janitor	5 00
	$180 35

For Month of March, 1886.

A. H. Webb, for expenditures as Secretary	$27 00
William M. Boggs, for expenditures as Inspector	95 65
William McDonald, for services as Janitor	5 00
Edward Denny & Co., for stationery	18 60
R. H. Follis, for rent of office	30 00
	$176 25

RECAPITULATION.

For month of April, 1885	$308 10
For month of May, 1885	247 08
For month of June, 1885	282 65
For month of July, 1885	265 25
For month of August, 1885	165 75
For month of September, 1885	164 65
For month of October, 1885	46 75
For month of November, 1885	1,001 99
For month of December, 1885	171 55
For month of January, 1886	175 20
For month of February, 1886	180 35
For month of March, 1886	176 25
Total amount of expenditures	$3,085 57
In addition to this amount, there has been paid by warrants drawn by the Controller of State, in accordance with law—	
For salary of the Secretary, at the rate of $150 per month	1,800 00
For the salary of Inspector of Fruit Pests, at the rate of $200 per month	2,400 00
Total amount expended	$7,208 57
Leaving a balance of the appropriation of $10,000 for the fiscal year commencing April 1, 1885, of	$2,714 43

In conclusion, it is but just to say that I have often been at inconvenience, and the collection and expenditures of moneys due claimants, on account of not being able to collect the entire appropriation at the commencement of the year, or as soon thereafter as the taxes had been collected.

All of which is respectfully submitted.

M. G. VALLEJO,
Treasurer.

TREASURER'S REPORT,

FROM APRIL 1, 1886, TO OCTOBER 30, 1886.

To the President and Members of the State Board of Horticulture:

GENTLEMEN: My last annual report of the financial condition of this Board closed on the thirty-first day of March, 1886, and showed a balance of the $10,000 appropriated for the year commencing April 1, 1885, of $2,714 43.

While there are but seven months of the present year's financial operations of the Board to report, yet in view of the fact that our second biennial report must be published in time to submit to the forthcoming Legislature, I deem it proper to submit to your honorable body the receipts, disbursements, and financial condition of the Board, from the first day of April, 1886, to the thirty-first day of October, 1886.

The following bills were duly presented and approved, and warrants drawn by the Controller of State to cover the same, vouchers for all of which are on file in the office of the Secretary:

For the Month of April, 1886, the following:

Ellwood Cooper, for traveling expenses in attending the meeting of the Board	$45 00
General M. G. Vallejo, for the same	20 00
G. N. Milco, for the same	22 25
N. R. Peck, for the same	20 60
A. F. Coronel, for the same	70 20
William M. Boggs, for the same, and other expenses as Inspector of Fruit Pests.	72 75
A. H. Webb, for expenses as Secretary	5 25
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
A. Roman, for books	59 00
Arthur M. Ebbetts, for coal	3 75
Total	$353 80

For the Month of May, 1886, the following:

A. H. Webb, for expenses as Secretary	$16 65
William M. Boggs, for expenses as Inspector	125 00
William McDonald, for services as Janitor	6 00
R. H. Follis, for rent of office	30 00
Mrs. L. G. Richmond & Son, for wrappers	2 75
Total	$180 40

For the Month of June, 1886, the following:

A. H. Webb, for expenses as Secretary	$15 40
W. G. Klee, for expenses as Inspector	63 70
William McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Total	$114 10

For the Month of July, 1886, the following:

A. H. Webb, for expenses as Secretary	$10 45
R. H. Follis, for rent of office	30 00
Wm. McDonald, for services as Janitor	5 00
W. G. Klee, for expenses as Inspector	84 75
Total	$130 20

For the Month of August, 1886, the following:

A. H. Webb, expenses as Secretary	$5 90
W. G. Klee, for expenses as Inspector	77 66
Wm. McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Edward Denny & Co., for stationery	11 40
Total	$129 96

For the Month of September, 1886, the following:

A. H. Webb, for expenses as Secretary	$7 80
W. G. Klee, for expenses as Inspector	98 35
Wm. McDonald, for services as Janitor	5 00
R. H. Follis, for rent of office	30 00
Total	$141 15

For the Month of October, 1886, the following:

A. H. Webb, for expenses as Secretary	$8 35
W. G. Klee, for expenses as Inspector	54 55
Wm. McDonald, for services as Janitor	6 00
R. H. Follis, for rent of office	30 00
Lyon & Kinsey, for bookcase	42 50
A. Roman, for books	208 46
Total	$349 86

RECAPITULATION.

Expenditures for the several months as follows:

For month of April, 1886	$353 80
For month of May, 1886	80 40
For month of June, 1886	114 10
For month of July, 1886	130 20
For month of August, 1886	129 96
For month of September, 1886	141 15
For month of October, 1886	349 86
Total	$1,402 47

In addition to this amount, there was paid:

To A. H. Webb, salary as Secretary, at the rate of $150 per month	$1,050 00
To Messrs. Boggs and Klee, salary as Inspectors, at the rate of $200 per month	1,400 00
Total disbursements for the seven months	$3,852 47
Leaving a balance of the $10,000, appropriated for the year commencing April 1, 1886, of	$6,147 53

All of which is respectfully submitted.

M. G. VALLEJO,
Treasurer.

OFFICERS AND MEMBERS OF PACIFIC COAST NURSERYMEN'S ASSOCIATION.

President,

James Shinn	Niles, Alameda County, California.

Vice-President,

W. M. Williams	Fresno, Fresno County, California.

Secretary,

R. D. Fox	San José, Santa Clara County, California.

Treasurer,

John Rock	San José, Santa Clara County, California.

Executive Committee,

James Shinn	Niles, Alameda County, California.
Robert Williamson	Sacramento, Sacramento County, California.
Gustav Eisen	Fresno, Fresno County, California.

Members:

W. R. Strong & Co.	Sacramento, Sacramento County, California.
William Coughlan	Marysville, Yuba County, California.
W. H. Pepper	Petaluma, Sonoma County, California.
G. Tosetti	San Leandro, Alameda County, California.
E. Gill	Oakland, Alameda County, California.
Coates & Toole	Napa, Napa County, California.
Asaph Cleveland	Oakland, Alameda County, California.
W. P. Hammon	Phœnix, Jackson County, Oregon.
D. W. Lewis	Fresno, Fresno County, California.
C. W. Reed & Co.	Sacramento, Sacramento County, California.
Isaac Collins	Haywards, Alameda County, California.
California Nursery Company	Niles, Alameda County, California.
E. Bourguignon	San José, Santa Clara County, California.
C. M. Silva & Son	Newcastle, Placer County, California.
Thomas Mehedin	San Francisco, California.
J. F. Kennedy	Los Gatos, Santa Clara County, California.
S. Newhall	San José, Santa Clara County, California.
W. W. Smith	Vacaville, Solano County, California.
A. T. Hatch	Suisun, Solano County, California.
G. M. Gray	Chico, Butte County, California.
O. Dickinson	Salem, Marion County, Oregon.
Luther Burbank	Santa Rosa, Sonoma County, California.
R. Bronson	Oakland, Alameda County, California.
G. C. Baxter	Haywards, Alameda County, California.
James Hutchinson	Oakland, Alameda County, California.
E. C. Clowes	Stockton, San Joaquin County, California.
James Waters	Watsonville, Santa Cruz County, California.
Thomas A. Garey	Los Angeles, Los Angeles County, California.
W. L. G. Soule	San Bernardino, San Bernardino County, California.
L. F. Sanderson	San José, Santa Clara County, California.
Milton Thomas	Los Angeles, Los Angeles County, California.
N. Wagendeller	Ukiah, Mendocino County, California.
George Husman	
F. W. Willis	Colusa, Colusa County, California.
J. T. Bogue	Martinez, Contra Costa County, California.

THE CALIFORNIA FRUIT UNION.

Principal Office, 507 Montgomery Street, San Francisco, Rooms 13 and 14.

TRUSTEES.

A. T. Hatch, President	Suisun, Solano County, California.
L. W. Buck, Vice-President	Vacaville, Solano County, California.
F. C. DeLong, Treasurer	Novato, Marin County, California.
H. W. Meek	San Lorenzo, Alameda County, California.

Wm. Barter	Penryn, Placer County, California.
Sol. Runyon	Courtland, Sacramento County, California.
A. Block	Santa Clara, Santa Clara County, California.
John Markley	Santa Rosa, Sonoma County, California.
Webster Treat	Davisville, Yolo County, California.

H. A. Fairbank, Secretary.

This Union has also the following branch offices and Secretaries, viz.:

Penryn	A. P. Hall, Secretary.
Newcastle	R. M. Nixon, Secretary.
Winters	Edwin C. Rust, Secretary.
Vacaville	Frank B. McKevitt, Secretary.
San Lorenzo	A. Preston Crane, Secretary.

CALIFORNIA FRUIT GROWERS' ASSOCIATION OF SACRAMENTO.

Principal Office at Sacramento. Incorporated March 30, 1886.

R. D. Stephens	President and General Manager.
A. F. Abbott	Vice-President.
W. S. Leake	Secretary.
E. Greer	Treasurer.

TRUSTEES.

R. D. Stephens. J. C. Boggs. A. F. Abbott. W. A. Briggs.
E. Greer. E. P. Figg. Joseph Routier. K. H. Plate.
R. B. Blowers.

THE ORANGE GROWERS' PROTECTIVE UNION OF SOUTHERN CALIFORNIA.

Main Office at Los Angeles.

L. J. Rose	President.
Abbot Kinney	Vice-President.
Farmers' and Merchants' Bank	Treasurer.
George Rice	Secretary.

EXECUTIVE COMMITTEE.

W. H. Workman. James Bettner. J. R. Dobbins.

J. R. Dobbins, General Manager.

MINUTES OF THE SEMI-ANNUAL MEETINGS OF THE STATE BOARD OF HORTICULTURE,

FOR THE FISCAL YEAR COMMENCING APRIL 1, 1885.

Office State Board of Horticulture,
April 23, 1885.

This being the regular day for the meeting, the members of the Board met at eleven o'clock A. M. There were present Messrs. Ellwood Cooper, William M. Boggs, A. F. Coronel, Dr. S. F. Chapin, Dr. E. Kimball, G. N. Milco, N. R. Peck, General M. G. Vallejo, and A. H. Webb, Secretary, being a full Board, excepting the Hon. H. C. Wilson, who was absent. President Cooper took the chair, and called the Board to order. The Secretary then read the minutes of the preceding meeting, which were approved as read.

President Cooper then recommended an election of officers of the Board, which was agreed to, and, on motion, Ellwood Cooper was unanimously reëlected to the office of President. On motion, General M. G. Vallejo was unanimously reëlected to the office of Treasurer, and A. H. Webb was unanimously reëlected to the office of Secretary. General Vallejo then moved that the Board proceed to the election of the Inspector of Fruit Pests, which was agreed to, and the President declared nominations in order, whereupon General Vallejo nominated Dr. S. F. Chapin, and G. N. Milco nominated Mr. Matthew Cooke. On motion of N. Peck, the nominations were closed.

President Cooper suggested the propriety of inviting candidates for Inspector of Fruit Pests to appear before the Board and give their views as to the duties of that officer.

This was opposed by Commissioners Boggs and Peck, and advocated by Commissioners Kimball and Milco, and after a full discussion of the question finally agreed to, and at half-past twelve o'clock P. M. the Board took a recess for one hour.

At half-past one o'clock P. M. the Board reconvened, all the members of the morning session being present. President Cooper took the chair, and called the Board to order. On motion of Dr. Chapin, Mr. Milco was requested to invite Mr. Matthew Cooke to appear before the Board and give his views regarding the office of Inspector of Fruit Pests. Mr. Cooke then appeared, and upon being introduced, proceeded in a brief and concise manner, stating that if elected his whole time and attention would be given exclusively to the duties of the office, and that he would strive to promote the best interests of the fruit growers of the State.

Mr. Cooke spoke of his large and valuable collection of insects, which, in his long researches in entomology, he had collected, and which, if elected, he would place in the office of the State Board of Horticulture.

Upon the conclusion of Mr. Cooke's remarks the Board went into executive session, and then proceeded to ballot for Inspector of Fruit Pests, with the following result: Dr. S. F. Chapin received five votes, Matthew Cooke received two votes, and Ellwood Cooper received one vote, whereupon the

President declared that Dr. S. F. Chapin having received a majority of all the votes cast, he was duly elected to the office of Inspector of Fruit Pests.

Mr. Coronel then spoke of holding the next meeting of the Board in the City of Los Angeles as being but an act of justice to the southern section of the State, when Mr. Boggs offered the following resolution:

Resolved, That the next meeting of the Board shall be held in the City of Los Angeles, at such time and place as shall hereafter be determined; and be it further

Resolved, That there shall also be held at the same time and place, under the auspices and direction of this Board, the fifth annual Fruit-Growers' Convention of California.

Mr. Boggs and Mr. Coronel strongly urged this resolution, and it was unanimously adopted.

The Treasurer's report was then read and approved.

A Committee of Arrangements for the holding of the next meeting of the Board, and the fifth annual Fruit-Growers' Convention at Los Angeles, was then appointed, consisting of Commissioners Coronel and Chapin.

The matter of appointing quarantine guardians for the different fruit sections of the State was then discussed at length, and also the efficiency and non-efficiency of the law to prevent the spreading of fruit and fruit tree pests and diseases, approved March 9, 1885, some members holding that it would be impossible to get suitable and competent men who would care to assume the responsibility of informing on, and, if necessary, proceeding to enforce the law against their own neighbors, while Mr. Milco thought otherwise, and urged the necessity and importance of immediate action by the Board in the appointment of quarantine guardians, and a vigorous and determined effort made to enforce the law, that the people of the State might see that the Board were endeavoring to do something in furtherance of the duties they were appointed to perform. This view of the question finally prevailed, and the following appointments were made:

Dwight Hollister, for the Sacramento River district; J. W. Mansfield, for Road Districts Nos. 1 and 2, Napa County; E. P. Foster, for the fruit district comprising the Town of Ventura, in San Buenaventura County; W. W. Chapman, for the fruit district contiguous to and including the Town of Petaluma, in Sonoma County; J. C. Weybright, for the fruit district comprising Calistoga and vicinity; John H. Guill, for the fruit district comprising Chico and vicinity, in the County of Butte; Clinton King, for the fruit district comprising Alameda Valley, Alameda County; George D. Kellogg, for the fruit district of Newcastle, Placer County; S. A. Wood, for the fruit district including Penryn and vicinity, Placer County; A. T. Perkins, for the Fruit Vale fruit district, Alameda County; H. G. Ellsworth, for the Niles, Mission San Josè, Irvington, and Centerville fruit districts, Alameda County; W. H. Robinson, for the fruit district adjacent to and including the City of Stockton, San Joaquin County; and Dr. G. Eisen, for the fruit district including the Town of Fresno, Fresno County.

In the matter of quarantine guardians for the City of San Francisco, it was assigned to the Inspector of Fruit Pests and the Advisory Committee for future action.

A committee, consisting of William M. Boggs and Dr. Kimball, was appointed to draft suitable resolutions on the death of the late W. H. Jessup, which were unanimously adopted with a standing vote, and the Secretary directed to forward to the bereaved family and the press a copy of the same. On motion, the Board adjourned to the following morning, at half-past eight o'clock.

FRIDAY, April 24, 1885.

The Board met at the hour appointed, all the members of the previous day being present. President Cooper took the chair and called the Board to order. After reading the reports of the various committees, on motion of Dr. Kimball an Advisory Committee was appointed, consisting of Ellwood Cooper, William M. Boggs, and Dr. Kimball, to act during the recess of the Board in the consultation and direction of such matters as they may deem necessary, Ellwood Cooper being Chairman of said committee.

The Board then appointed John R. Sweetser Quarantine Guardian for the supervisorial district comprising the Town of Novato, Marin County, when, on motion, the Board adjourned to meet at their next regular meeting.

THE NOVEMBER MEETING.

The Board met in the Exhibition Hall in the City of Los Angeles, at one o'clock P. M. on the nineteenth day of November, 1885.

There were present Messrs. Ellwood Cooper, H. C. Wilson, William M. Boggs, Dr. E. Kimball, Dr. S. F. Chapin, G. N. Milco, and A. H. Webb (Secretary). Absent, General M. G. Vallejo and N. R. Peck. A letter was received from General Vallejo, stating that he was prevented from attending the meeting of the Board on account of sickness in his family, and expressing his regrets.

President Cooper took the chair and called the Board to order. The Secretary then read the minutes of the preceding meeting, which were amended and then approved.

The President then called for the reports of committees. The committee appointed to make arrangements for the fifth annual Fruit Growers' Convention, consisting of Dr. Chapin and Mr. A. F. Coronel, then made a verbal report through Dr. Chapin, and that portion of the report referring to the employment of a stenographic reporter by Messrs. Boggs, Chapin, and Milco, when, on motion of Dr. Kimball, the Board adjourned to forty-five minutes past twelve o'clock to-morrow.

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NOVEMBER 21, 188~~6~~.

The Board met as per adjournment. President Cooper in the chair. Present, Messrs. Cooper, Kimball, Coronel, Milco, Chapin, and Boggs.

The President called the meeting to order, when Mr. A. K. Whitton, the stenographic reporter, appeared before the Board and stated that the work of reporting the proceedings of the convention was more than he had anticipated, and that he would be compelled to charge for the work in proportion to the amount to be done. After a full discussion of the subject, it being conceded that the work was greater than had been anticipated, it was finally moved by Mr. Milco, seconded by Mr. Boggs, that Mr. Whitton be allowed for his services in reporting, transcribing, and preparing for the printer the entire proceedings of the convention, the sum of $265, which was accepted by Mr. Whitton.

A proposition in writing was then handed in by Messrs. Dewey & Co. of the "Rural Press" of San Francisco, proposing to publish in pamphlet form the report of the State Board of Horticulture for the year 1885, including the proceedings of the convention, free of charge to the Board, and in addition to give the Board one thousand copies of said report free of charge, in consideration of the privilege asked for, and on motion of Mr. Boggs the proposition was accepted by the Board.

The President then suggested a course of action in regard to the preparation and examination of essays for the forthcoming report, when on motion the Board adjourned to half-past four o'clock P. M.

The Board convened at half-past four o'clock P. M., President Cooper in the chair, and all the members of the morning session present. The President called the meeting to order, when Mr. Wilson moved to declare the office of Inspector of Fruit Pests vacant, which motion was seconded by Mr. Boggs.

After a discussion of the subject the President put the question and directed the Secretary to call the roll, and the members to vote as their names were called. On calling the roll the vote resulted as follows: those voting aye were Messrs. Boggs, Kimball, Milco, and Wilson; voting nay, Cooper; not voting, Messrs. Coronel and Chapin.

The President then declared the motion carried, and the office of Inspector of Fruit Pests vacant. On motion of Dr. Kimball, the Board then adjourned till to-morrow, at two o'clock P. M.

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SATURDAY, November 22, 1886.

The Board met as per adjournment. President Cooper took the chair and called the Board to order. There were present Messrs. Cooper, Boggs, Coronel, Kimball, Chapin, Milco, and Wilson.

The President declared nominations for the office of Inspector of Fruit Pests then in order, whereupon Mr. Boggs nominated Dr. Lotspeitch, Mr. Wilson nominated Wm. M. Boggs, Dr. Kimball nominated Matthew Cooke, Mr. Coronel nominated Alexander Craw, and Dr. Chapin nominated John Britton. On motion, the nominations were then closed.

The President directed the members to prepare their ballots, and the Secretary to act as teller.

The first ballot resulted as follows: Dr. Lotspeitch, 1; Wm. M. Boggs, 1; Alexander Craw, 2; Matthew Cooke, 2; and Ellwood Cooper, 1.

Second ballot—Dr. Lotspeitch, 1; Wm. M. Boggs, 2; Alexander Craw, 1; Matthew Cooke, 2; and John Britton, 1.

Third ballot—Wm. M. Boggs, 3; Alexander Craw, 1; Matthew Cooke, 2; and John Britton, 1.

Fourth ballot—Wm. M. Boggs, 3; Alexander Craw, 2; and Matthew Cooke, 2.

Fifth ballot—Wm. M. Boggs, 3; Alexander Craw, 1; Matthew Cooke, 2; and John Britton, 1.

Sixth ballot—Wm. M. Boggs, 4; Matthew Cooke, 2; and John Britton, 1.

Whereupon the President declared that Mr. Boggs, having received a majority of all the votes cast, was duly elected to the office of Inspector of Fruit Pests.

On motion of Dr. Kimball the Board adjourned.

PROCEEDINGS OF THE FIFTH ANNUAL STATE FRUIT GROWERS' CONVENTION,

UNDER THE AUSPICES OF THE STATE BOARD OF HORTICULTURE.

The convention met in the Grand Opera House, Los Angeles, at ten o'clock A. M., Tuesday, November 17, 1885. Ellwood Cooper, President of the State Board of Horticulture, presided. A. H. Webb, Secretary of the State Board of Horticulture, was assisted by E. J. Wickson, Secretary of the State Horticultural Society.

Upon calling the convention to order, President Cooper announced that Mr. Stephen M. White, who had been chosen by the Los Angeles Citizens' Committee to welcome the delegates to the city, would deliver his address at the afternoon session. President Cooper then delivered his opening address as follows:

PRESIDENT COOPER'S ADDRESS.

By reason of the position which I hold, as President of the State Board of Horticulture, it is expected of me to deliver an address on this occasion, and to mark out or submit a plan to govern our exercises at this convention, to point out the subjects of greatest importance, and the manner of discussion, so as to facilitate our work.

This will be the fifth annual Fruit Growers' Convention held in this State. The law creating the State Board of Horticulture, as it formerly stood, did not authorize the incurring of any expenses for such purposes. Voluntary contributions were necessary to meet the outlay. Each convention had a separate and independent organization and adjourned sine die.

While, as I said before, it is the fifth, it is the first over which the State Board assumes the control and that will have continuous organization. A complete record will be kept, and our office, the seat of information on every question that arises, will be accessible to all the fruit growers in the State. The plan for our next annual convention, to be held in 1886, will be determined here; so that much more possibly can be done at future gatherings than can be accomplished now.

Before submitting my plan, however, I will make a few introductory remarks on the subject of

Horticulture.

To quote from a lecture delivered by Baron Ferd. Von Mueller, in November, 1880, at the request of the Social Science Congress, of Melbourne, he said:

> While Science is to shed light on the path of instructive progress to lead to the development of natural resources; Art to mold and refine æsthetics to react on the tone of social and domestic life; Literature a guiding influence on the progress of the times, on the welfare of the State; Economy to advance mutually the interests of the whole population—it is left to our gathering to advocate the vast interests involved in horticultural pursuits.

To quote still from that great man:

> Directly or indirectly, man is nourished, clothed, and, indeed, provided with many of his other requisites by plants. The very implements of his daily avocation, the comforts of his home, the fuel for his hourly wants, the means of locomotion, the very paper, without which his intellectual communication beyond the reach of voice would become an impossibility but for the offerings of the empire of plants. If the teachings and debates of our convention should tend to advance in any way the interests of horticultural pursuits, then we may claim to have aided in promoting the welfare of our own, and perhaps other communities.

A. Coutance, Professor of Natural Science of Paris, in his elaborate work on the olive, compiled from the time of the most ancient records, states that the laws were made for the protection of wheat, the olive, and the vine.

J. De Barth Shorb, in an address delivered before the State Agricultural Society in September, 1882, said:

> The history of agriculture is coincident with that of civilization itself, and so intimately blended that the study of one means necessarily the study of the other. * * * Civilization depended on agriculture and climate. This carries the mind back to Egypt, the birthplace of European civilization, five thousand years ago. This country, in many material respects, is similar to our own, and may be studied with interest and profit to us all, as it existed thousands of years before the Christian era, and remains substantially the same to-day. What Egypt has been to European nations, California should be, and must become, to the American nation. Why was it that civilization thus rose on the banks of the Nile, and not upon those of the Danube and Mississippi? The answer is, civilization depends upon climate and agriculture. As long as life is a scene of uncertainty, that the hopes of yesterday may be blighted by the realities of to-day, man, in the imperious demand for present support, dares not venture on speculative attempts for the purpose of ameliorating his condition. Agriculture in Egypt is certain, and there man first became civilized. Agriculture in California can be made as certain, and here man should develop a civilization and prosperity unequaled in the world's history. The arable land of Egypt is only two thousand two hundred and fifty-three square miles, and yet from this insignificant area were supported at one period over seven millions of people.

Still quoting:

> At San Gabriel there are lands adjoining the old Mission buildings which have been cropped twice a year since the foundation of the Mission, one hundred and ten years ago, and they still retain their fertility unimpaired. This is purely the result of irrigation.

I call your attention to this last paragraph, as it is contrary to every theory as laid down in all the agricultural journals in the country. They claim that only by systematic fertilizing can the productive power of the land be secured. This is particularly claimed by French scientific journals, regarding continued fruit crops. The one great expense attending fruit production in that country is the fertilizers. The above claim is that only water is required.

It is not a difficult matter to write an address generalizing on the subject-matter, but what we want is hard facts presented in the briefest and simplest manner. In what direction is our attention here to turn in horticulture, and in what aspects does it present itself to us?

The importance of horticulture in relation to educational training has never yet been sufficiently recognized. Our children should be taught it in our common schools; their observations enlarged, their interests enlivened. They should be made to feel their responsibility in the proper care of every useful plant. But very few people appreciate the difficulty to be surmounted in the conduct of an experiment. "Nature makes experimenters," says Professor Cassidy of Colorado. No man can be successful in this line of human effort who is careless, slovenly, and loose as a practitioner. The practice in the profession is largely the ability to measure details.

Subjects for Consideration.

The important subjects before this convention I have arranged or classed under four different heads, Nos. 1, 2, 3, 4. These again, with the exception of the fourth and last, I have subdivided into three different heads, first, second, and third, as follows:

No. 1. Insect pests and the care of trees.
No. 2. The preparation, marketing, and disposing of fruit.
No. 3. The variety and kinds of fruit trees to be encouraged.
No. 4. Protection to fruit industry.

Subdivisions of Nos. 1, 2, and 3.—No. 1. First, the most inexpensive remedies to apply for the destruction of insect pests, how to apply, the time to apply, and the cost. Second, the cultivation, the pruning, the time to prune. Third, proper laws to prevent the spread of insect pests. Number one in the order as given above will be disposed of on Tuesday. No. 2. First, the care in selection, the kind and size of packages, the marketing and shipping. Second, the proper time to gather the different kinds of fruit, the curing, etc. Third, how the fruit growers are to dispose of their fruits without coming in competition with each other as to prices for the same quality and kind of fruits. Number two will occupy all of Wednesday, including night session. No. 3. First, the best varieties of the different kinds of fruits to meet the wants of consumers in the different seasons. Second, the actual demand and probability of increase. Third, the encouragement to new planters to confine themselves to such fruits as are not in sufficient supply, or in excess, and to those that the consumption appears to be for the time being unlimited. No. 4. The fourth class or subject (protection to the fruit industry) requires very careful consideratiou, as every individual giving his views would naturally be biased in favor of his special line of interest.

You will see by this programme that there are four general divisions of the subject. I propose that we take them up in their order, limiting or giving one day to each. The subdivisions of the classes Nos. 1, 2, and 3 can be arranged for the equivalent part of the day. The remarks of all the members to be limited as to time, unless by special privilege. This programme will consume four days of our time. The fifth day I propose to give to the plan of preparation for our next annual convention.

Horticultural Books Recommended.

I have examined the proceedings of quite a number of horticultural societies held east of the Rocky Mountains, and find in their discussions a very wide range of subjects. Our capacities, for climatic reasons, being very much greater and largely different, suggests an independent scope, and that we confine our deliberations more especially to such points as will increase or secure our greatest prosperity in the line of our natural advantages. Allow me, however, in this place, to recommend that every locality procure for its public library a copy of the transactions of the Mississippi Valley Horticultural Society for 1884. In this book there is a register of every National and State Horticultural Society in the country. A copy of each can be secured, so that every citizen can have access to them.

These books or reports have papers on almost every imaginable subject kindred to fruit culture, with discussions on the same. I would also recommend a book published in Washington by the State Department, in June, 1884, No. 41½. This latter is especially interesting to those engaging in citrus or olive growing. If we expect to succeed in our fruit enterprises, we must read.

Insect Remedies.

Going back to my plan or programme, which I have represented, I will briefly review some of the points or subjects before closing. No. 1, the first class—insect pests and care of trees. I would call your attention to the various bulletins that have been issued, giving the formula of certain mixtures represented as efficient remedies for the destruction of certain insects. We have the bulletin of B. M. Lelong, San Gabriel, January 25, 1885—forty pounds whale-oil soap, four gallons coal oil (110° fire test), one hundred gallons water; cost, $2 84. For the black scale, spray in September and October; they hatch through July and August. My remarks regarding these different mixtures will be confined to their effect upon the black scale on olive trees, I have not experimented with other insects on citrus trees sufficiently to make a report. The statement that they hatch through July and August is true, yet not strictly true, for the reason that I have known one year—1883—the hatching to begin early in July and hatch continuously up to the middle of the following February, a period of seven months. The bulletin of S. F. Chapin, November 25, 1884, gives this mixture, which contains five different ingredients besides the water. It is impracticable unless put up already for sale by some one who is prepared to do so in the exact proportions. The cost is two and two thirds cents per gallon. It is too expensive, unless guaranteed, and the guaranty would depend upon the application or in whose hands it was made. I will state in this place that since writing the above, and during the time I was waiting for the steamer to come to Los Angeles, I examined some citrus trees—orange, lemon, and lime—that were badly affected with the black scale in May last. After two sprayings with the whale oil and iron compound, all the insects had disappeared before November thirteenth.

The bulletin of Dobbins, Rice & McKinley, Los Angeles, October 15, 1885, is as follows: Twenty-five pounds brown soap, six pounds wood potash, four gallons coal oil (110° test), one hundred gallons water. This mixture would, I suppose, cost about two and one half cents the gallon.

Matthew Cooke's remedy, copied from a Los Angeles paper in March last, is as follows: Ten pounds whale-oil or other soft soap; sulphur, two and one half or three pounds; coal oil, one gallon; water, seventeen gallons. Cost, about three and one half cents. All these mixtures are good, no doubt, and would kill the newly hatched or young scale, but how about the scale hatched after October? If we have to keep constantly spraying we had better use tobacco decoction, which costs ten times less.

Kerosene oil has been considered by entomologists the most effectual insect destroyer. The Agricultural Department at Washington has taken the same view, and has from year to year given directions how to mix and use. As a matter of course the greatest care must be exercised in preparation and application. I refer you to report of 1884, page 331. The experimenters seem to have arrived at the perfect solution. I have adopted their formula for emulsifying, but for the olive tree washing double the strength. The proportions in the bulletins of which I first made mention range from fifteen gallons water up to twenty-five gallons to one gallon of oil. The Government reports nine gallons of water to each gallon of the emulsion. In diluting the emulsion I only use six and one half gallons water to each gallon of oil, and I use only the best quality of kerosene oil to be had in the market (150° fire test). It mixes better, and is therefore safer in the application. The cost of my mixture is about four cents a gallon, and it takes for large olive trees about sixteen gallons on an average. The cost therefore per tree, not counting the labor, fuel, etc., is sixty-four cents each washing.

I experimented with the kerosene mixture in April, from fifth to eighth, with the strength of fourteen to one, and failed to see much benefit. At the same time, with the strength six and a half to one, the trees were not injured and most of the scale killed. I had the same result on lime trees.

At the same time I experimented with pyroligneous acid on the olive trees, each gallon of acid diluted with one gallon of water. The result was a perfect success, as every part touched in the spraying the insects were destroyed. The acid cost in San Francisco, including the barrels, twelve cents; the freight and wharfage to Santa Barbara about two cents, equal fourteen cents the gallon; eight gallons of acid with eight gallons of water makes the cost per tree $1 12 each washing.

From July twenty-ninth to August twenty-fifth I gave my trees a thorough spraying with a decoction of tobacco; October twentieth to November tenth a thorough spraying with kerosene oil, each gallon diluted with six and one half gallons water. I also experimented between the last given dates with pyroligneous acid, spirits of turpentine, and ice-water. The result of these experiments will be given at our subsequent convention.

My formula is: Five gallons best kerosene oil, 150° test; one and a fourth pounds good common soap, or one bar and a half of soap usually sold as pound packages; two and a half gallons of water. This makes the emulsion. When using, dilute six and a half (to seven) gallons of water for each gallon of oil, and to this mixture add two and a half pounds of good home-made soap dissolved in boiling water. All this mixing is done with hot water. We usually have 140° in the tank from which we spray.

For the woolly aphis on apple trees I have had good success with caustic soda, at a very moderate cost.

For flowering shrubs or garden plants, I would recommend sulphur and lime. Formula: Two pounds sulphur, one pound lime, two gallons water; boil one hour. Dilute one gallon of the mixture with three gallons of water, or more water, according to the strength of the plant. The most important question with which we have to deal is remedies for the destruction of insects, and we should be very careful before recommending any remedy as certain in its operation.

Ravages of Insects.

In the address of Parker Earle, President of the Mississippi Valley Horticultural Society, delivered in January last, he stated that three fourths of the entire apple crop were destroyed by insects. This seems like a terrible waste. In Santa Barbara County we certainly have not more than one fifth of an olive crop gathered in any one year.

From another authority, B. D. Walsh, it is stated that the annual loss in the United States amounts to $300,000,000 from insect pests alone. From a report made by B. F. Johnson, of Champaign, Illinois, he states that the "chief cause of diseases in vegetation is mal-nutrition, and that, with proper surroundings, sufficient food, and abundant water, orchards and all other trees will be healthy and fruitful." This theory is not borne out by our experience in semi-tropical trees. The "*Icerya purchasi*" is no respector of conditions in orange trees, or any of the citrus family.

Under the second subdivision of the first subject I have mentioned, the cultivating and pruning of trees, I would remark, concerning

The Pruning and Cultivation of Olive Trees,

That the pruning should be done immediately after the fruit is gathered. All dead wood should be removed, and vigorous thinning out on the inside of the trees, so as to admit the sunlight and air. This rule should apply to all trees. The cultivation should be thorough. The top surface should be well stirred four or five times in the spring. Plowing is only necessary when the crust under becomes hard.

Anti-Insect Laws.

I come now to the third subject in the first class: "The laws to prevent the spread of insect pests." So far as I have been informed not one single test case has been made. In Santa Barbara County the *Icerya purchasi*, commonly called the white cottony cushioned scale, the worst of all insect pests known in this country or any other country, is gradually spreading and nothing done to prevent it. In the Town of Santa Barbara a partial effort has been made. No legal steps have been taken to quarantine this most terrible pest. I cannot foresee the future regarding it, and am at a loss to advise. I fear it will cost the citizens of Southern California millions of dollars.

The second subject proposed is the

Marketing and Disposing of Fruit.

Fruits should be graded as to size, handled with great care, neatly packed in new and clean boxes or packages, and artistically marked. The kind and size of package should be agreed upon and a bulletin issued by the Inspector, so as to be distributed pretty generally amongst the fruit growers, giving also the cost of such boxes or packages in San Francisco.

How the fruit growers are best to dispose of their fruits, I pass over by simply calling attention to the discussion had some weeks ago in San Francisco (also on the eleventh of this month), where a proposition was made to establish a central office or business house through which all the fruits were to be disposed of, each orchardist to be entitled to one share to each acre in fruit-bearing trees (on the thirteenth of November articles of incorporation were filed), the variety and kinds of fruit to be encouraged. The third class I pass over for the present.

The fourth class,

Protection to the Fruit Industry.

I will state how it operates with regard to my business—making olive oil, growing almonds and English walnuts. We pay labor $1 a day and board. The boarding costs us about 35 cents, say two francs; labor, five francs, equal to seven francs. In the south of France and Italy they pay labor one franc; the boarding costs not over one franc, total two francs; difference five francs, or equal to $1 per day on every laborer employed.

The freight from San Francisco to New York on oil is $60 per ton; from the Mediterranean $15, or one fourth, so that without an import duty, other things being equal, it would be better for me to proceed at once to Southern Europe to carry on my business. With walnuts and almonds we make the same comparison, except that the freight on these to New York is $40 per ton, and from south of Europe about half as much.

While I wish to avoid any political discussion at this meeting not pertinent to our actual demands or necessities, I will in this place state that if we want laws to protect and encourage the greatest prosperity of our State, we must, as intelligent citizens, look after the framing of them. We cannot plead indifference, or preoccupation; we cannot ignore the community in which we live—our district, our county, our State, or our common country.

We must look after the disbursements of our money. Our taxes are more and more every year, notwithstanding we have constantly ringing in our ears honest administration, economy, retrenchment, etc.; but no matter what party wins, it is still "more money." Take 1875 as the basis of value for my ranch. The first decade, or 1885, the increase (in taxes) is seventy per cent, or seven per cent yearly. There is nothing to warrant any such increase.

Tree Planting.

The most of you perhaps will remember that about ten years ago a law was passed by the Legislature to encourage tree planting on the public highways. No trees to my knowledge have been planted under that law, not because the amount to be given for each tree was insignificant, but because it was impossible to protect them. The framers of the law had not an intelligent idea of the subject. I think it is time to revive this most important necessity.

We ought to encourage forest tree planting for the protection of our fruit trees. It is my candid opinion, based upon my experience, that three fourths of the area in fruit trees, with one fourth in forest trees, will produce more fruit and better fruits than the same area would without the forest trees.

Freight Rates.

Our freights are very much too high. I am satisfied that they can be reduced one half, and still give a fair profit to the railroads. On the coast, where we have no railroads, we have suffered very greatly from the exorbitant charges of the steamship company. Recently an opposition line has been established, and the rates reduced in some instances to one fourth the former charges. This reduction by the old company is manifestly, or presumably so, made in an effort to compel the new line to withdraw. In this connection I wish to call your attention to the new Constitution, Article XII, Section 20, page 26:

> No railroad company or other common carrier shall combine or make any contract with the owners of any vessel that leaves port or makes port in this State, or with any common carrier, by which combination or contract the earnings of one doing the carrying are to be shared by the other not doing the carrying.
>
> And whenever a railroad corporation shall, for the purpose of competing with any other common carrier, lower its rates for transportation of passengers or freight from one point to another, such reduced rates shall not be again raised or increased, etc.

Why single out a railroad company and not apply the same rule to all common carriers? Again, Declaration of Rights on Corporations, page 44, after defining corporations, forbidding pooling, etc., we find this clause: "Preventing the increase of railroad rates that have been reduced for purposes of competition."

Here we have the railroad singled out again. Why? Because the "hue and cry" against the railroad was popular. The politicians vied with each other to pile on restrictions as to the railroad, and possibly at the same time the paid agents of other common carriers. The spirit of justice did not reign. The omission or exemption as to other common carriers renders us helpless. I cannot help believing that it was intentional, and it should warn us of the danger of selecting our representatives. We must know whose interest they represent.

As I said before, we must demand reasonable rates of freight, and we should, in return, put our fruits on the market at the lowest possible prices that the business will warrant. This would cheapen the cost to the consumer and increase enormously the demand.

Solomon has said, "As a nail sticketh between the joinings of a stone, so sin sticketh between the buyer and seller." And while this does represent the general tendency of trade, we ought to come up to the high standard of the Golden Rule—to "Do unto others as we would have them do unto us." "Let us consider those deeds the greatest which give new sources of comfort, both physical and mental, to mankind, and which harmonize the interests of all branches of the great family of man."

After delivering his opening address, President Cooper announced the first topic of discussion, "The Most Inexpensive Remedies to Apply for the Destruction of Insect Pests; How to Apply, the Time to Apply, and the Cost."

Dr. J. M. Frey, of Newcastle, Placer County: I have a small orchard in the northern part of the State, in Placer County, which is very much infested with insect pests of all kinds. The woolly aphis is almost, probably, the worst we have, and the red spider. I find that coal oil is the best remedy to use, so far as killing the insects, but we find it very liable to kill the trees. I found it necessary to make an emulsion which would thoroughly disguise the oil and do it in the cheapest possible manner. As I had a number of cows, and saw something in the paper about an emulsion of milk, I tried that, and I think I hit upon the cheapest plan, and easiest and safest manner of applying coal oil. I took about five gallons of skimmed milk, and churned it with one gallon of coal oil. I found it good for killing the woolly aphis and the scale. It cleared my trees of the scale and woolly aphis, but it did not kill the red spider. To attack them I made a mixture of whitewash and salt, and whitewashed the trees and branches so far as I could get at them, but the branches ran out so small that to whitewash them took some little time. With these two simple remedies I have cleared out all the insects from my orchard. In packing my pears this last year I instructed my man to be very careful and pick out all the pears that were attacked by the scale, and I don't think that I had a bushel of pears that were so affected. A great many orchards around me are entirely ruined, and I think that my experience is worth something.

A Delegate: I would like to inquire what proportion of water was used in the emulsion.

Dr. Frey: I took five gallons of milk and one gallon of coal oil; to that I added eight gallons of water. Different trees will bear different remedies, and of different strength. For instance, the olive is a very tough tree; you can give it twice the strength you put on the cherry tree. The peach is also a tree that is easily hurt; you have to be very careful with that, but on the apple, the plum, and the quince you can put a pretty good strength and not be liable to hurt them. The whole thing is to be very careful not to have globules of kerosene floating on top of the mixture. You must make a perfect emulsion, and then no harm will be done. The cherry tree, however, is very apt to be hurt.

Dr. O. B. Conger, of Pasadena: I suppose friendly criticisms are very proper to be made. I rise to criticise this remark that this gentleman has just made, that you must thoroughly make an emulsion or else the kerosene will have a bad effect. I would like to ask what the property is that does the work; is it the kerosene or the milk in the emulsion?

Dr. Frey: The kerosene, undoubtedly. It must still be in the form of kerosene, whether it is with milk or whale-oil soap.

Dr. Conger: Now, to my mind, kerosene is a bad agent; or an agent, perhaps, that will do damage to the delicate foliage, so far as I have experimented with it. I have set it aside, from the fact of its penetrating the bark of the tree or the leaf. I can not say that I have seen direct injurious results from one application, but I suspect that if it is continued there will be harm arising from its use, from the fact of its penetrating, or liability to penetrate, the bark and leaf of the plant. We all know that if you place it upon your hand it is readily absorbed like many volatile substances. It readily disappears in the wood of the tree. It spreads very rapidly and passes away from sight. Perhaps, to some extent, it evaporates; but I apprehend that it penetrates the bark and the leaf of the plant, and hence it must interfere with the circulation. Now, there is an erroneous opinion arisen in regard to making this emulsion, in my judgment. The people, in making the emulsion, imagine that when they have diluted it, it acts in some other way—not directly as kerosene, and there is the point that I rise to call attention to: that in whatever form it is used, it still acts as kerosene.

Mr. Williams, of Fresno: By mixing certain elements we sometimes destroy the deleterious effects of those elements. Now, by mixing with milk, as Dr. Frey suggests, does not the emulsion destroy the effect of the kerosene upon the live plants, and can we not preserve those properties in the kerosene that destroys the animal life and yet preserve our plant life?

Mr. L. J. Rose, of San Gabriel: As far as destroying the effect of the coal oil in the emulsions is concerned, I think there is nothing in it. I think an emulsion is for the purpose of evenly distributing the coal oil on a tree. If there is no emulsion, why then it separates and keeps to itself and you are liable to spray your tree with nothing but coal oil, but an emulsion takes it up and distributes it evenly through a certain quantity of water or whatever you may spray with. I have sprayed a good deal in my time, and I believe that if you can get along without coal oil it would be better not to use it. It certainly kills, but it also injures the tree; if you use it as an emulsion that is the least injury, because you apply it so lightly to every part, but there is danger where you do it in large quantities, and leave these matters to other parties, that they may not get a good emulsion, and even in the emulsion that I have, I find that my trees have suffered to some extent. I believe that you will find where you have sprayed trees with an emulsion two or three times that some of the twigs are dead, that the leaves fall on some parts of the tree, that the tender green bark will be discolored, as will be found by cutting into it. I wish to call attention to a matter that was brought to my notice on the cars by a gentleman whom I hope will be here, Mr. Thomas, of Visalia. He says he has some wood with him that has been washed with a solution of brine—salt dissolved with water, as much as it will dissolve, and the tree washed with it, for what is known as the San José scale. He told me it had killed all the scale on the tree and it afterwards had made a good growth, and it was entirely free from scale. So far as many remedies are concerned they are remedies that will apparently kill all or mostly all the insects on the tree, but so far as my experience goes I have not perfected anything. I have the same thing to deal with from time to time, and it is a continued labor. Now, if we could get something that would do this and would absolutely destroy it so that we would be free from it, of course the benefits would be much larger. Whether this is possible or not I do not know. I have studied over this a good deal because it is my interest to study it. I have thought perhaps that some kind of odors, some kinds of gases, some kinds of fumigation under a tent, that would reach every part of the tree, would probably do the work. I have been in hopes that people who have more leisure would experiment with it and find out something in that direction, and I still hope that something will be found out that will be a better remedy than anything we have. Whether there is anything in this salt remedy or not, I do not know. The gentleman is here, and he has some wood which I think would be interesting for the people to see.

Mr. Thomas, of Visalia: If you will permit me, in the afternoon, I will bring those samples of wood before you and explain to you all I know about it. It is something I only discovered a few days ago in Fresno County. I gave it as severe investigation as I could. I only found one gentleman that used it, and I think it is a success, so far as that gentleman used it.

John Brittan, of San José: I suppose that I have had some experience in eradicating the San José scale. I do claim that I was the first man to use a remedy for it. I unfortunately bought an old orchard about the time that the scale became prevalent there. I got a pretty good dose of it—enough to keep me busy for three or four years. I started in on the basis of potash. I liked potash because there is nothing lost in using it, and if I spend fifty dollars to put it on my orchard I think I get it back in the course of a few years. I have always considered that without potash you will not get very good fruit. That is a great question for fruit growers to consider. The question of spending fifty dollars and getting some of it back again in other ways, besides destroying the insect, is important. I adhered to my original plan, and I did exterminate on my orchard the San José scale. I started in on it some eight or nine years ago, and for the last two years I have not seen a sign of the scale; in fact, I eradicated them so well that I have not washed for two years. I began using pure potash or concentrated lye by dissolving it in water and thoroughly drenching the trees. I did not confine myself to simply spraying them. I gave them all that I thought they ought to have, and I was not careful about saving it at all. I simply let it go onto the ground, and I found out that after continuing in that course of treatment for three years I began to get the better of the scale, and for the last two years I have not seen a sign of them in my orchard. I have an idea that if a tree has all the potash it wants that these insects can't destroy it. The potash seems to be an antidote for the poison that these insects inject into the tree. I have always based my theory that they did not destroy a tree by what they took from it, but by what they left therein. If you cut off the bark from a tree which is infested with San José scale, so that you can see the inside of the bark, you will find it all red, and that red extends right into the inner part of the tree. I find that by applying lye that after it had performed its work that red color will become extracted, come right out onto the tree and form a gum on the outside, and then the bark takes on its natural color again. I have had a tree so badly infested with the San José scale that it produced no leaves for two years, and yet that tree recovered and is standing a healthy tree to-day. I attribute it to the effect of the lye. I believe the lye destroyed the poison. I am perfectly satisfied it will destroy all insects. You can kill all the red scale on a tree, and if the tree does not get some remedy to overcome that poison, the tree will then die. I know that such has been the case in Santa Clara County. From my experience, therefore, I think that lye is the best remedy and that lye should be the basis of all washes. Tobacco water, as the President stated, is good, because it contains more lye than any other wash that can be used. I consider that all washes should be based on potash, not only for the immediate effect, but for their beneficial effect afterwards.

Dr. Frey: How much water do you use to a pound of potash?

Mr. Brittan: I never have used the wash any stronger than one pound of concentrated lye to four gallons of water. I have experimented with it stronger, but I never used it so as a general thing.

A Delegate: Is the potash as good as the concentrated lye, or is it cheaper?

Mr. Brittan: That is all governed by the amount of potash you get in a pound. I have always found the American concentrated lye the cheapest. We can get it stronger from that than from any other ingredient we can use. The American concentrated lye I use should contain ninety-five per cent of potash.

A Delegate: I should like to inquire what kind of an apparatus did you use in applying it?

Mr. Brittan: I use a Gould pump—one of those small Gould force pumps. I have a tank, and put the tank on a sled and a Gould pump and hose, and a common garden hose nozzle.

Mr. Wilcox, of Santa Clara: There is this to say about that wash, and it is so with all applications for these pests—sometimes they succeed, and sometimes they fail. Four or five years ago I put out a couple of thousand pear trees. Some of them were affected, and part of them were not; and the insects have increased a hundred per cent since that time, although the trees were all dipped before they left the nursery, and although I quarantined them on my place, and burnt the refuse, so that the insects would not spread that way. I am inclined to think the lye is effectual, but I think sometimes these insects are about the roots of the trees, or about the clay of some substance around them that the lye did not penetrate. After all the experiments we have made at San José, and we have made them very extensively, we have some left. I was induced a little while ago by Mr. Settle, of the Farmers' Union, where we get all our washes, to buy a barrel of sal-soda. He said that was the most effectual of anything they had tried. I would like to hear from other persons in regard to that matter. I am inclined to think that these washes are all effectual, but that they do not always reach the insect.

J. H. Kellogg, of Tustin: Eighteen months ago, digging around one of my apple trees, I discovered that I had a pest, which I was told was the woolly aphis. I was advised to put lime and ashes, mixed, around the butt of the tree, and to pour on some water; and Dr. Chapin proposed to take caustic soda and make a solution and let it run down. I tried both, and the lime and ashes were not effectual. The caustic soda I applied, and I found it killed the woolly aphis. I applied it again and again, perhaps five or six times, and I think that I have nearly conquered the woolly aphis around the trunk of the tree; but it would appear again in the foliage and around the larger branches. To defeat that I put on coal oil. I took a brush and dipped it in coal oil and applied it, and that will kill the woolly aphis: but it breaks out in another spot, and as the matter stands, about one half of my apple trees are free from the woolly aphis and the other half are still affected, and I am still fighting them.

Mr. G. N. Milco, of Stockton: As nearly as I can understand, this county has been seriously infested by the cottony cushion scale. I would like very much to hear what has been done in the matter, and what remedies have been prescribed, and then I shall offer something that I have got on the subject. I have a remedy, and, if the members of this meeting will allow me, I will submit a letter on the subject:

Sacramento, November 14, 1885.

C. N. Milco, Esq.:

Dear Sir: I write to advise you that I have been using buhach for the extermination of the cottony cushion scale, with very favorable results. The trees infested were in gardens, some having beautiful grass plots, and others were stocked with choice flowers, etc. I could not use the common washes containing coal oil, etc., as it would destroy the flowers, grasses, etc.

After defoliating the trees, shrubs, etc., I used a solution of soft soap, fifteen pounds, buhach one and a half pounds, water twenty gallons. The trees and plants being thoroughly sprayed, the grounds were also thoroughly soaked so as to destroy any that had fallen off. I have made a thorough investigation, and cannot find a living scale on the trees treated in this way; besides, the use of the buhach instead of coal oil, etc., protected the grass and other plants.

I intend repeating the spraying lest any may have escaped on the flowering plants, and will report to you fully, or at least will send you the report that I will make to the Board of Trustees of this city, who ordered the work done.

I am well pleased with the result so far, and I consider the money expended in purchasing thirty pounds of buhach was an excellent investment, not only as a safe remedy for the protection of plants, but as an insecticide; in such cases it has no superior.

Yours, etc.,

MATTHEW COOKE.

It may not be known, Mr. President, that Mr. Cooke took a contract from the Trustees of Sacramento City to eradicate the cottony cushion scale for a certain consideration, and no money to be paid unless they were satisfied that the work was done.

Mr. Cooper: Please state the cost of that mixture.

Mr. Milco: My opinion is that the cost of this wash, according to his formula, will be something in the neighborhood of seven cents per gallon, but as the wash is not used, as my friend Mr. Brittan says, through a common garden hose, but through the Cyclone nozzle, the wash will go a good ways, and a gallon will probably go over a good deal of space.

Mr. G. M. Gray, of Chico: I would like to say one word on the lye question; it seems to have been dropped. I do not know the amount of lye that each person could make by collecting the ashes and making his own lye, but that would be better than anything we can buy. We have at Chico several engines running in town and on the ranch where I am at work. We have taken pains for the last three or four years to save all the good hard-wood ashes that we could gather, and then at the time that they want to use the lye to make it in hoppers, running it into a large pine tank which is buried in the ground (it seems to hold it better that way than any other we can find), and we use the lye for these insects which are doing so much damage. I agree with these gentlemen who have remarked upon this question that I believe there is nothing any better to be used than lye. When we use concentrated lye we use three fourths of a pound to a gallon of water; that is about as strong as the more hardy trees will stand, and it is as strong as we can handle. We have no San José scale, but we have been troubled with the rose scale or the white scale on our blackberries, and by going over the blackberry bushes twice each year we are getting rid of them entirely. This fall there seems to be a sprinkling of them, but only a few; and we have reduced the quantity of woolly aphis very much from the apple trees by using this lye once or twice during the winter, and putting ashes around the roots of the tree. A half bushel, or about that amount, is placed around each tree, and we have continued that until I think now there is only one woolly aphis where there were a thousand three years ago. As to the cottony cushion scale, there was one tree which stood in the woodyard away from anything else and it was reported to me two years ago that it was covered with something white. I went and examined the tree and found it the cottony cushion scale, and we haven't found anything of the kind anywhere else in Butte County that I know of. That was the only tree, and where it came from, and how it happened that they were not scattered more, is a mystery. I spread straw around the tree for a foot deep, and cut off every branch and let them lie on the straw two or three days until the leaves wilted, and burnt it all up. I supposed it would kill the tree, but the next spring it came out and now it has a large, fine crop, and not a sign of the cottony cushion scale on it yet.

Dr. O. F. Chubb, of Orange: I want to state in regard to the lye treatment, that under my observation some gentlemen were using concentrated lye with lime, a very thin wash and very cheaply prepared—I think one pound of lye and one pound of lime to five gallons of water. They used lime, claiming that it attracted the lye to the limbs and the leaves of the tree and retained it longer. It is one of the latest applications that we are making in that county, and it seems to do the work most thoroughly. Now, there is a point that is touched on by the gentleman from Santa Clara that I think needs more consideration than we have been giving it: that is the application of such remedies as contribute to the growth and thriftiness of the tree. I believe that it will accord with the observation of most of you, that the more thrifty any fruit tree is in its growth the less it is affected by the pests, and the scale particularly. That has been my observation, and I believe if the most eminent chemists would give it their attention and give us the chemical ingredients necessary to promote the more thrifty growth, so that we would use those, we would have less trouble with the scale. I call to mind an orchard that I examined in this city two years ago, where the entire tree was almost entirely free from the black scale which was then the only one infesting this section to any extent (that is, the white scale had not been talked of), and I asked the owner how he had secured that degree of cleanliness from the black scale. He said he had done it by making a very heavy application of sheep manure from the sheep ranch and corral. He hauled on a very large quantity and applied it thoroughly. There was one tree that I discovered that had a large amount of black scale on it. I said: "How is this that this tree is so affected and the rest so clean?" He said that the tree was damaged, and called my attention to the body near the ground, where the bark had been almost torn off clear around from a team he had cultivating running away with the harrow and running against the tree and breaking off the bark and almost destroying the life of the tree. It so far interfered with the growth that there had been no growth for two or three years; the result was it was covered with black scale at that time. At the time I saw it, it was somewhat recovering. This point of promoting the thrift of trees, and if possible by applications that will also kill the insects, I believe is a vital point.

Dr. E. Kimball, of Haywards: I have an olive orchard at my house, about five hundred trees. They became thoroughly infested with black scale; on every limb, some of them. I cut off the entire top in March, a year ago, from four hundred trees; cut them right down to hitching posts, leaving only short stubs of limbs. I subsequently washed those trees with concentrated lye—one pound to four gallons of water—simply sprayed them with the San José nozzle. On the sixth of May the first leaf came out; they now have tops almost as large as they were before, and from some of them I have picked five gallons of olives this year. On the hundred trees that I did not top there is more or less scale now, although treated in the same way—by drenching them thoroughly, but not with the same treatment; I treated them with ten pounds of Los Angeles whale-oil soap and twenty pounds of quicklime to forty gallons of water. That has not killed the scale entirely, though very little is left, and none of it has been communicated to the trees that I topped. I fail to discover one on them, and they are in a very vigorous condition. I then tried the same wash—ten pounds of whale-oil soap and ten pounds of quicklime to forty gallons of water—on about twenty-five lemon trees that were thoroughly infested with the black scale and some willow scale. It had not the slightest effect upon the willow scale, but the black scale it has about half killed. I have not found that effectual on any trees; but the one pound of lye to four gallons of water, I have found effectual. That will eradicate the black scale, the only scale I have except the willow scale.

Mr. T. A. Garey, of Los Angeles: Dr. Chubb's statement in regard to the vigorous growth of orange trees having a tendency to clear the tree of black scale, is a fact. I have known orange trees taken out of nurseries in the vicinity of Los Angeles, thoroughly covered with the black scale, planted on the rich high land toward the mountains, where the conditions seem to be more proper and better for the orange trees, and they cleared themselves entirely without any application of anything whatever. The change in the location and the vigorous growth of the tree will clear the tree of the black scale; but that is not the case with the cottony cushion scale. The more you cultivate the tree the more vigorously it grows, and the more vigorous your cottony cushion scale becomes. I don't think it has any tendency whatever to reduce it. It is a pest that will require the combined wisdom of the people of this State and locality to remedy and to eradicate; and that remedy should be cheap enough to be within the reach of the people who need it. Now, when Mr. Milco talks about seven cents a gallon for the expense of his buhach and other things, that ends the matter. Though it may kill all the scale, the cottony cushion scale, the ordinary orchardist cannot afford to pay it—it would bankrupt him. About as cheap and probably a better method would be to dig the trees up and burn them up. We must get a safe, and sure, and cheap remedy. A few wealthy men of this county may stand seven cents a gallon for spraying their trees, in order to eradicate the white scale, but the ordinary run of orchardists can't do it; so that however effective a remedy may be, we could not have it because of the expense—it would be an embargo upon it. Now, I hope out of the deliberations of this convention, and what we may learn to-day, that we may get down to something that would be practicable in the way of eradicating this terrible pest—the cottony cushion scale. I do not think that we have any San José scale in Los Angeles County; if we have, I have never heard of it. I don't know for certain. But it is of great importance to us to know something about it, and the prevention and the cure; because a cure for the San José scale would be likely a cure for the cottony cushion scale, and that is the thing we are looking to more especially. The woolly aphis has also been referred to. My impression is, the best way to kill woolly aphis is to dig the tree up and burn it up. One gentleman from Orange stated that he applies a little coal oil when he sees it on the branches; and one third of his orchard is clear and two thirds are affected. I think it will continue to do that way; it is a continuous trouble and a continuous expense. The woolly aphis, I think, is one of the most difficult things to eradicate from our orchards that we know of. In regard to the remedy of brine, proposed by Mr. Thomas, of Visalia, I suppose that he has reference to the San José scale on deciduous fruit trees. I would like to know of Mr. Thomas how long it has been since he made that experiment, and the condition of the trees after he made the experiment? They have been speaking about the deleterious effects of the coal oil on trees. I do not think it will compare with brine. I think the salt brine will kill the tree outright, and you will get rid of it without any trouble, insects and all. I know that salt brine around the roots of orange trees will kill the trees; they will shed the leaves almost at once, and the tree will dwindle until it dies, if there is any strength at all in the brine. You have got to look out for that.

Mr. Milco: As near as I can understand the gentleman, the complaint is that the remedies, like that proposed by Mr. Cooke, were too expensive.

Now I would like to know how much money has been spent in washes for the last five years in this State, and I would like to know whether there is a single man here to-day who has an orchard that is clean from insects. I would like to know if there is a man on this floor who has a remedy.

MR. GAREY: I would like to know if you have a remedy.

MR. MILCO: The remedy is just read to you.

MR. GAREY: Well, is it effectual by one application?

MR. MILCO: It seems so from this letter from Mr. Cooke.

MR. WILLIAMS, of Fresno: I think this is the best opportunity for Matthew Cooke to get a big contract on his hands right here in Los Angeles County. He took a contract in Sacramento for eradicating the scale permanently for $200. I think there were four places that were infested with the scale, and if we had Mr. Matthew Cooke down here I think we would give him a big job, and if that remedy is as effectual as they say it is, I think it economy to let Los Angeles County out to him, and let him do the job up at once and get rid of it.

A DELEGATE: How large was the tract in Sacramento?

MR. MILCO: I don't know anything about the extent, but I know I read an article in the "Record-Union" last July, calling attention to the danger of the spread of this scale insect, and finally it was brought before the Trustees, and the result is just as Mr. Cooke states in his letter.

At this point the convention adjourned until afternoon.

At the opening of the afternoon session on Tuesday, November seventeenth, the following

ADDRESS OF WELCOME

Was delivered by STEPHEN M. WHITE, Esq., of Los Angeles:

MR. CHAIRMAN, LADIES AND GENTLEMEN: Some little time ago the committee to which the management of your reception had been intrusted inquired whether it would be convenient for me to address to those who should assemble here words of welcome, and to say in behalf of the citizens of Los Angeles County in general, and more particular in behalf of those who are directly interested in the work in which you are engaged, that your advent is not only in accordance with public desire, but that the greeting which you may expect will be cordial and sincere. Entertaining such sentiments myself, and glad of an opportunity to give them utterance, I accepted the invitation, thinking without justification, it seems, that I would be able to reduce my thoughts to a coherent and intelligible form. I know that it is the habit of those who address public assemblages to excuse themselves for crude and unstudied utterances, and when this is done the speaker, as a rule, has stored in his pockets, or placed in the printer's hands, a very large amount of manuscript which has been the subject of much attention.

However unreliable such statements generally are, I can, nevertheless, truly say that it has been impossible for me to prepare anything in the nature of a speech, and the limited experience I have had in such matters has convinced me that inadequate preparation is worse than none, and that extempore efforts are calculated to do more good than partially preconceived efforts. Perhaps it is better that unyielding circumstances have precluded my giving this address the care it merits by the occasion. Had I been "prepared," I would no doubt have spoken glowingly of our balmy atmosphere and Italian skies; would have dwelt upon the dryness of the air, and I might have said something as to our irrigation necessities. In view of the condition of our streets, the demand for overcoats, and the uncertain tenure by which we all hold our umbrellas, such remarks would have been the subject of no little embarrassment.

With this preliminary, let me say that Los Angeles City and County, and Southern California, extend to you an earnest and enthusiastic welcome.

Glad to have you here as friends, we are overjoyed at the presence of an organization formed on a legal basis, and endeavoring in a scientific way to insure the permanency, and advance the interest of that which is fast becoming the leading industry of California. It is not long ago since the interests represented by you were regarded as merely incidental to others—as hardly worthy of secondary consideration. Men looked to mining, the raising of stock, and, in some localities, to the production of cereals, as about the only means of acquiring a livelihood; and to have attempted a thorough investigation of those matters which you are here to fully examine, would have been deemed an idle dream, a visionary scheme, unworthy the attention of a practical man.

How great the change which time has made in this, as in almost every walk where the requirements of the situation draw upon the industry and intellect of man! And how the face of nature has been transformed, and even the current of trade reversed!

Not many years have elapsed since it was supposed that marketable apples could not be grown in Los Angeles County. Yet, a few days ago, when our fair was held in the large market building nearly opposite us, one person displayed three hundred varieties of magnificent apples, raised by him in this county. The exhibit not only enlisted universal comment, but excited the applause of the numerous visitors from other States, who were fortunate enough to witness that tangible evidence of material development. Potatoes, cabbages, vegetables of all kinds were largely imported by Los Angeles dealers some years past, and the assertion that a miscellaneous fruit production would ever emanate from this portion of the State, if ever made, would have been treated with unconcealed incredulity.

It is unnecessary to refer to the patent fact that fruit production has passed the embryo stage, and that the great possibilities, which are offered by our climate and peculiar condition, are of such magnitude as to render it difficult to realize them.

To me, one of the most pleasant features of the situation is to be found in the contemplation of the fact that our movements are not directed by chance, and that combined effort will soon eliminate the element of uncertainty which must ever attend that class of business which is at the mercy of a stronger power. Nor is the prospect only that which follows combination. Intelligence and experience are to guide and to govern this organized industry. The Legislature will enact such laws as are found consonant with fundamental maxims, and at the same time sufficiently comprehensive to effect the desired object.

When the initiatory steps toward the extirpation of fruit pests were being taken, many well-minded persons objected to investing, as they said, plenary power in a few men. It was asserted that it was dangerous to permit the invasion of private property against the will of the owner, and under circumstances which did not seem, viewed "in the light of other days," to warrant a disregard of the owner's wishes. "I can and will attend to my own business," was the cry. But, adopting that practical business-like view, which is, perhaps, incident to American manhood, and remembering that the citizen must so use his property as not to materially impair that of his neighbor, and that the "police power" was coextensive with the danger, our fruit growers are practically unanimous in their submission to official authority, and the only question appears to be as to the most desirable means to gain the desired end.

We cannot, and indeed do not, attempt to deny that the fruit prospects are largely impaired by the presence of numberless and invidious foes; in this very city the scale bug seemed for a long time to be master of the situation. Slow, non-radical treatment was barren of results, and only since "heroic treatment" was adopted have we entertained, and, with reason, too, strong hopes of ultimate mastery.

The methods essential for success—those from which the best results will flow—must become matters of common learning before the fight can be said to be thoroughly organized.

You, gentlemen, who are devoting yourselves to this work, not merely for your personal benefit, but also for the well-being of your fellow citizens, must, through your personal labor, and by means of conventions such as this, supply the needed instruction—give the proper education.

The consequences of your movements upon the enemy are being notably felt. I observe a steadily growing desire to recognize and appreciate your leadership in the important charge over which your jurisdiction extends.

You are looked to as forming a tribunal created to furnish useful information, to make suggestions, and to carry out the views you enunciate. All parties interested have a right to look to you for this, and I know they will not look in vain. The eradication of a serious peril—one which menaces the permanency of our State's resources—is no trivial affair.

The proper treatment of the vital issue thus presented is of more importance to us at present than the result of any political caucus or convention, or even election. I do not feel myself competent to make any specific suggestions to you, but allow me to say that the efficacy of your action here depends somewhat upon its unanimity. Divided counsels are rarely productive of intended benefit. Full, candid, and thorough discussion should, no doubt, be had; but after ample consideration make some recommendation upon which you can afford to stand, and do not doubt that your decision will be considered enough to warrant its general and practical application.

Our knowledge has surely reached the point where we clearly and unmistakably see that without the aid of the Government, and an intelligent body to enforce the law, our prospects would not be bright, or the chances of enduring prosperity encouraging.

That American brain and muscle is fast winning the upper hand in this battle, I take for granted, and with that conflict determined in our favor, who can measure the greatness in store for California? There was a day in the earlier stages of her being when those who, animated by youthful energy and lured by tales of golden treasures, came to her shores for pecuniary gain alone. Their restless activity guided them to hitherto unexplored fastnesses, under, along, and over beds of rivers, below the mountain's base, all to acquire enough to enable the possessor to return to his native heath and enjoy the profits of his perilous enterprise. Those days are gone. The cattle king with his mighty herds finds his exterior boundary lines contracting. The great farmer, whose thousands of acres yielded him but a meager crop, sold at a meager price, is gradually passing away. The spirit of progression waves us on toward the vineyard, the orchard, the neat homes, the garden, and the well cared for stock farm.

Ancient methods are being displaced, and the mind, as well as the soil, is found to be a subject for profitable cultivation.

The tendency of your efforts is toward a higher civilization; it means the increase of independent land owners, the encouragement of those things which civilize, which do good, which destroy crime, or rather obliterate its causes.

The unavoidable delays which the late storm has occasioned, and the consequent change of hour for this meeting, has somewhat complicated my business appointments. I am, therefore, compelled to close, which I will do by welcoming you once more to Los Angeles, assuring you at the same time that you will have general and cordial coöperation in your efforts to advance and promote those great enterprises, which, supplying honestly acquired wealth, at the same time drive away care, and develop and cause to be transmitted that happiness and personal satisfaction which is among the most common of legitimate aspirations.

DISCUSSION ON INSECT FIGHTING.

After the address of Mr. White, the discussion on injurious insects was continued.

L. J. Rose, of San Gabriel: I have been a resident here for some time and engaged in orange culture, and have done a great deal in the way of trying to eradicate the scale bug. In the first place we had the red scale, and we were very much alarmed about it. I then began cutting off the trees, trimming them so as to leave nothing but the bare branches, and scouring the whole tree with soap and water. After a few years they grew out very beautifully but were as full of the red scale as they were before. I have the cottony cushion scale now, and I am doing everything I can to find out what will kill it. We have done a great many unnecessary things, and we have done things that may have been of doubtful benefit and of more expense than is necessary. The formula that I first used was whale-oil soap, coal oil of such a standard of fire test, and potash. We now find that whale-oil soap is not necessary, in fact it is an injury, because it stains the fruit; whereas common cheap soap does not stain the fruit, so we are using a wash that costs less money. Again, the fire test coal oil was considered a great benefit and a great necessity. If I may judge from my experience, it is of doubtful benefit; in fact, I think it is of no benefit at all. It kills the bugs, but the potash kills the bugs without it, and the potash is a benefit to the soil, and is of no injury in any respect. I will state to Mr. Milco that I have heard before of Mr. Cooke's opinion and belief. I do not know of a man that I have a greater esteem for in this matter. On the other hand, I have gone through so much here, have seen so many things that turned out failures, that I have some little misgivings that Mr. Cooke is mistaken too. I know something of the lot in Sacramento which he treated. They had little trees that were trimmed off and radically treated, and I have no doubt that they are free from the cottony cushion scale to-day. According to the experience we have had here for two years with the remedies I have said I have used, they kill the bug, but there is another fact: as soon as you begin spraying, the bug falls off the tree and it buries itself in the soil, and when you are done spraying the bug again ascends the tree, and in a little while, by its prolific habits, is as numerous as ever. Now, this has been my experience; it has been the experience of the whole county. You cannot show me one place where the scale has been eradicated. That is a broad assertion, but I think it will be substantiated when thoroughly inquired into. I have seen cases where you have said: "Eureka! we have accomplished it; it is no more here," but in the course of two or three weeks they found some. That is a great misfortune. Mr. Cooke has had favorable conditions. He has had trees eight or ten feet high. He trimmed them himself and had a small territory, and he has, as he believed, eradicated it. I hope it is true, but we have trees here that are thirty feet high, and it is almost an impossibility for the spray to touch every animal, but if you can it kills it. And it is not only necessary to spray the trees, but you must have some way to prevent the scale bug from ascending again; that is what we are trying to do, and every little while we find something that we think has accomplished the end. We have not quite succeeded yet. I have belief that it can be done, but up to this date we have not done it yet, to be able to say that we have wiped it out in any one place as a permanent proposition.

It is true that the cottony cushion scale is easier killed than any other scale bug; it is easier handled than any other that I know of, and I believe that in time you can entirely destroy it. As it stands, I do not fear it a great deal except as a matter of expense. I have heard some of my neighbors say that even the expense they were at in spraying was of such benefit in the brightening of their fruit and of the growth of the trees, that in the end the work we are doing will pay. That we can keep it under so that it will be of no permanent injury is true, but, of course, we would be glad to avail ourselves of any remedy that would do the work and have it done with forever. I will say to Mr. Milco that seven cents a gallon for his preparation will not be a bar to our use of it, but it must be proven that one application will be the end of it, for we have now remedies that are much cheaper.

Mr. Milco: I will say, as Mr. Rose touched on the subject, that if Mr. Cooke can be paid by Los Angeles County for his expenses to come down here and make some experiments, at any time, we will furnish all the material free of charge.

Mr. Rose: I will assure him his expenses will be paid. I will pay my portion of it, and pay half of it if he will do it. There will be no question about the expense.

Dr. Conger: I have great admiration for Mr. Rose, but however skillful any one person may be in any special line, in something that he has but little experience in he is about as liable to err as a novice, possibly. Now, Mr. Rose has an immense tract of land; he has probably the largest orange orchard in Southern California, and it is a puzzle to a great many how it can be carried on by one brain. It is very extensive, and unfortunately the red scale and the white scale have taken possession of a large portion, especially the red scale. I am quite well aware of his experiment in cutting away the trees along that noble drive leading up to his house some years ago to eradicate the scale, but in my opinion, after he had treated those trees as he related, had he eradicated them from the balance of his orchard they never would have returned to those trees. I think there is where the error comes in. I hardly think there is a question about that, that after treating that avenue the scale bug was yet existent in the other portions of his orchard, and, of course, it is on its way back to those trees that were so thoroughly treated. The red scale is confined to only a few localities in this section of the county. In the southern portion of the county it is quite persistent, and is exciting a good deal of interest. In the section which I represent—that is Pasadena—we have not had the red scale, but we have had the cottony cushion scale, and it has fallen to my lot to be the guardian of that district. The first tree I found on my place I raised a rumpus about, and went to the paper and advertised it, and of course I had all Pasadena on my shoulders. They said you are going to destroy Pasadena by publishing that you had the cottony cushion scale. Fortunately I was not selling real estate, and I did not care very much how those who were giving their entire attention to selling lots were disposed to growl because I was finding that in my orchard. I immediately went down to my tree and cut the top entirely away—that is to say, I cut it so as to leave the branches sticking up so [experimenting with his fingers], preserving the contour of the top of the tree; but I cut away every limb and every leaf, and then I got simple, common soap and water and scrubbed it down, every portion of it. I laid down a canvas around the tree and put every branch as I cut it off on that canvas, and carried down some hay and built a bonfire and burned all the brush on that canvas in that bonfire. Then I took a shovel and dug up the soil for, say three inches, all around that tree, and burned the soil and shook the hot ashes around the surface of the ground and went home. That was the last of May, and there has not any scale bug appeared since. Now the tree has a fine top, some of the limbs are an inch or more in diameter, and there are no signs of the cottony cushion scale at all; yet that tree was literally alive with them. I state this for the purpose of showing that there is a remedy. That is the point; but it may take as much brain as kerosene or potash to eradicate the scale or anything else. Now, I pretend to say that there is not a white scale in California on an infested tree but that can be eradicated from it by that simple process; and it didn't cost half, probably, what is being expended every day in the week on things that are killing the trees as well as the bugs. I relate this to show that there is a remedy. There are other remedies, in my judgment. In a little orchard where we supposed that the scale had its first lodging in Pasadena—Mrs. Black's orchard—we found one hundred and ten trees badly infested. It fell to my lot to attend to those trees and see that those bugs were eradicated. A gentleman loaned me a spraying apparatus, and we together got up a mixture different somewhat from anything I had ever heard of at that time. In the first place I had the tops of about sixty of the worst trees entirely cut away as I had my own, and treated in the same way precisely. I think a little coal oil was used in that mixture for scrubbing the trunks down. The balance of the one hundred and ten trees were thinned out and sprayed with fourteen pounds of caustic soda and four or five pounds of common soap to the hundred gallons of water. The soda cost us 6 cents a pound wholesale, so the expense was scarcely a penny a gallon. To but two of the trees that were cut away and thoroughly washed did the scale ever return up to four weeks ago; the others are perfectly free to this day. Of the balance of the trees, where the tops were not entirely cut away, I found eighteen that had a few scales on a few weeks ago, and I ordered those sprayed again. Now, the point that I make is this: It is, as Mr. Rose says, almost impossible to reach every portion of the tree with any material that you may use; and there is where the difficulty lies. Then, if you wanted to spray the trees repeatedly with a strong solution, you are going to kill your trees; and why? Every time that you spray with a strong solution you are checking the flow of sap, you are interfering with its vitality, you are interfering with its functions; hence if you repeat that once a week, as some have suggested, you constantly keep the tree back and it will lose its vitality, and if it does not kill it outright it will very seriously interfere with its vigor, whereas if you cut the top of the tree away at the outset and use the simplest material, you get rid of all the scale there is. You destroy the last one, and by watching a little along for the next two or three months, there is no necessity of any scale returning to any of those trees. There may be a few in the soil. A cultivator never should be used about those trees, for the insects are carried by the teeth of the cultivator from one tree to another, and some persons may go in an orchard and carry it from one to another. But if you watch the trees, they generally lodge two or three feet from the surface of the ground, and, of course, you can kill them at once. Now, here is a solution that costs scarcely a penny a gallon that will kill this white scale. I use caustic soda, which costs less than anything else; and in the solution that I make, instead of clear water I use a saturated solution of lime water. Potash, of course, would be better than soda, because of its fertilizing value, but it costs a little more than sal-soda. It only takes a quarter of a pound of lime to make a gallon of lime water, so you see it is comparatively inexpensive; and the lime itself will destroy the fungus and some other things, especially if you put in a pound or two of soap, and with your caustic soda, you have got a solution that costs you a trifle over a penny a gallon, if it does that; and most assuredly, gentlemen, it will destroy the white scale. I cannot speak as to the red scale, as I have never tried it. It is an entire remedy for the black scale, although I must say that something has occurred in California this year that has destroyed the black scale entirely. In Pasadena and Orange and the places I have visited we cannot find living specimens of the black scale. I wish to suggest to people who have the white scale that the quickest, and surest, and safest method is to cut the top away. It puts it right out, and in a few years you will have a crop of fruit on it, and with less trouble and less expense; and I believe the vitality of the tree would be subserved by that method.

Mr. Cooper: I would like to ask what the expense would be to treat an orchard in that way.

Dr. Conger: I paid 15 cents a tree for the spraying of that solution. In cutting back and pruning up I do not remember exactly; I think for the whole work it was about $100 for the one hundred trees—cutting the tops away, scrubbing them down, and burning the brush—the entire work.

Mr. J. W. Sallee: I want to say a few words about the red scale. I have just returned from the southern part of the county, and have talked with a great many fruit raisers about the eradication of the red scale. They have almost universally come to this conclusion: That to undertake to kill a red scale after it has matured and thoroughly attached to the leaf and fruit, is almost impossible. It is a scale that attaches itself very closely to the fruit, so that it is almost impossible to reach it with any known solution, and it will hatch four times—four generations in a year. When the young bug first comes out it crawls around for a couple of weeks, and in that stage it is very easily killed; and it is the conclusion of all that I talked with, that to kill the red scale you must spray often enough to catch the young bugs on foot, with a solution that will not cost more than 25 cents a tree to spray in the foliage, without cutting the top. Mr. Joel Parker has some trees that have been infested with the red scale for four years. He has only sprayed once during each year until this year, and he has preserved both the tree and the fruit, while his neighbors, who have not sprayed at all, have lost the tops of their trees, and last year the crop of fruit.

A Delegate: You speak of orange trees?

Mr. Sallee: The red scale does not infect deciduous trees; and these trees I speak about are orange trees exclusively. Had they sprayed four or six times a year, at the expense of 25 cents a tree, that would be only $1 50 a tree; and if it had been done this year the fruit on the tree would have more than paid all the expenses, and given a handsome return to the owner besides. They have come to the conclusion that if they spray frequently, catching the young bugs on foot, they can eradicate them entirely; and it cannot be done in any other way, and they spray with caustic soda, as recommended by the last speaker.

Dr. Conger: I wish to add what I have omitted—that the solution of fourteen pounds of caustic soda to the hundred gallons would injure the fruit to such an extent that it would make it unmarketable. The necessity or the advisability of cutting away the top of the tree at the outset is because, if you have to spray them continuously, as you have to unless you cut off very materially, you destroy the fruit by spraying with a solution that will kill the bug. That is the fact.

Mr. Sallee: It does not require a strong solution to kill the young bug when it is crawling; before it attaches itself to the tree or the fruit.

A Delegate: Hot weather seems to be more conducive to the growth of the red scale than cool weather, while cool, damp weather is conducive to the black scale. This season has been a prolific one for the red scale. The means of spreading the scale from one orchard to another is a matter we ought to consider. It has been suggested that birds carry the scale, and it is very probable that in building nests, as they are sometimes allowed to do in trees, will start a growth of scale on a particular tree that will spread to an adjoining tree. At our last horticultural meeting in Orange we passed a series of resolutions aimed at the honey bee. Some are very positive in their ideas that the honey bee is one of the greatest means of spreading the small scale (the red scale, and possibly the white scale); and we resolved, as the sense of our meeting, that the apiaries should be removed to the mountains, beyond the reach of the orchard. It has been discovered in some cases, where small orchards were just beginning to bear, that only those trees that had blossoms were infested with the red scale, while others surrounding them, that had not blossomed yet, had none at all. That led us to conclude that the scale was carried by the bees as they visited the blossoms. If that is a fact it is a question of interest to be considered; because when an orchard is once clean it ought not to be again replanted with the scale by the bees or the birds. We are all friends of the birds; but if they are going to attack our means of livelihood, we will have to attack them also.

Mr. Goepper, of Santa Ana: I think that Mr. Sallee is mistaken about the red scale not going on any trees but citrus trees. At our last meeting at Orange a gentleman there stated he has found the Italian cypress trees thickly covered with them. I didn't see it myself, but there are other gentlemen here that heard the statement, and remember his name.

Mr. Sallee: I have seen the red scale on other trees, but I have never seen them appear to breed on those trees. They seem to have been carried there after they had hatched. I don't think that they hatch on any other trees except citrus trees.

Mr. Milco: Last summer a fruit grower in your vicinity, in San Joaquin, came to me and said he had twelve acres of common prune trees and there seemed to be thousands of the San José scale running at large all over the trees. He asked me to come over and make some experiments with buhach. I drove over to his place with a small quantity of the powder of buhach and made a solution at the rate of fifty gallons of water to a pound of buhach, which would cost about a cent a gallon (if a person were buying it in large quantities), and I sprayed three or four trees, just for an experiment, and told the gentleman that I would come over again and examine those trees and bring a microscope, and see what the result was. Before we sprayed the trees they were perfectly alive with living scale about the size of chicken lice; you could fairly see them with the naked eye. The next time we came there and cut off a piece of a tree about as big as a silver five-cent piece and placed it under a powerful microscope, and I dare say there were a thousand dead insects on it—some of them stuck to the bark and others hanging in every shape—but dead, not moving. In three or four days after that, the same man came back again and said: "You have not killed the scale bug at all; they are creeping all over the tree." It is a fact, as the preceding speaker has said, that these scales are coming out in several breeds; a lot of them may come out to-day and another lot next day, and so on for eight or ten days, and while they are coming out in that way I don't think there will be any trouble to kill them. And that applies not only to the San José scale, but to every other insect that is moving. A solution of buhach will do it without any danger to the tree, the foliage, or the fruit.

MR. SALLEE: I want to make one more suggestion on the subject, and I will illustrate it by cultivation. No orchardist would undertake to cultivate his orchard once in a year and let it go for the rest of the time, because the weeds will spring up; he must go frequently and kill those weeds as they come. Neither does he want to buy a steam engine to do his cultivating; he wants the cheapest material he can work with. It is just so with the scale bug. If we expect to eradicate the red scale especially we must do it by frequent application of a cheap spray that will kill them, and a very cheap spray will kill them when they are on foot; but when they are attached it is not wise to try to kill them. As Mr. Rose has said, there are many failures though many have been killed, and if left alone they will in a very short time cover the entire tree. It has been well said that the price of oranges is eternal vigilance.

MR. GAREY: This whole scale bug question is a matter of experiment in the State of California and will be for a long time. One man is using one solution, another man is using another; one a certain emulsion, and another another emulsion, and so on, and so the matter is experimental. We will be in this experimental stage for a considerable length of time, and there is this about that: In this matter of experiment we must be careful not to ruin our orchards nor to bankrupt ourselves; we cannot afford, I think, to spray our trees six times a year at the cost of 25 cents a tree each time. It looks very well on paper to sit down and figure out how much your orchard, your crop, will bring you, and that if we spray and save our crop it will bring so much money, and we will have so much left; but the solid facts are that it costs $160 per annum on that plan just for the one item of spraying our trees. We cannot afford it; orange orchards will be a thing of the past in a few years if we have got to continue that year after year. We must find a cheap and effective remedy that will do its work, if possible, at one operation, and that will do it thoroughly and effectually, so that we have some time to rest, some time to recuperate. To-day we are told there are effective remedies that run from 1 penny to 7 cents a gallon; that is a wide range. Now, then, if the penny remedy is effective, that is the thing we are after, for we must get down to a cheap and efficient remedy. The Board of Supervisors of this county have offered as a premium or reward $1,000 to be given to the party who will invent and apply a cheap and safe and efficient remedy for the destruction of the cottony cushion scale. Some of us want that $1,000, and I hope some of us will get it, for that is what we must have. There are men in this county who can afford to pay $50, $75, or $100 an acre to clear up their orchards, because they have something else; but I tell you, Mr. President, there is not one man in ten in Los Angeles, or any other county, that can afford anything of the kind. You may take and cut a tree off, denude it completely of branches and leaves and everything down to the bare trunk, and take nothing in the world but a bucketful of water and a certain amount of elbow-grease, and commence at the top and work that right through from the top to the bottom, and you will kill every white scale on it. That you will do by mere manual force, and a man can do about twenty or twenty-five trees a day, I think, after the limbs are cut off. I just speak of this to show that it can be done. Here is Mr. Conger, and my friend who sits on the right, who manages the Cascarona Orchard of fifteen hundred trees, in this city, who has had a great deal of practical experience, and who has succeeded in using common refuse soap, that was formerly worth nothing, and is now sold at a cent and a half a pound. With this material and a scrubbing-brush, and the willing power of his good right hand, he has gone to work and cleared his place, and now it is perfectly clean. As Mr. Rose says, the white scale is very easily killed, very easily handled. He is very much mistaken about the last part of it. It is very easily killed, but it is the hardest bug to handle, so far as the entire destruction of it is concerned. There are very few remedies that don't kill a scale bug; the trouble is, you don't get it on all of them, and they increase so fast and crawl up the tree again. I would like to hear from Mr. George Rice, the Secretary of the Commission for this section. He is a practical man, and one who has had a great deal of experience.

COUNTY COMMISSIONS.

George Rice: The Horticultural Commission is appointed by the Board of Supervisors, as provided in the State law, and every county in the State can have such a commission. I don't believe any other county has appointed one; has there, Mr. Chapin?

Dr. Chapin: There are quite a number of counties that have appointed County Boards of Horticultural Commissioners. Some of them have recently appointed new members to fill vacancies which have existed by natural dropping out and the time expiring for which the Commissioners were appointed. Ventura is one county, San Diego has lately appointed a new Commission, and Kern County has done so. There are other counties that have Commissions, but they are not working accurately; and, in fact, it has been owing to some misunderstanding as to what they may be permitted to do under the county laws, and without coming in contact with the State law on the subject. A little further on, if it is desired, I will express the views which some have taken upon that subject, and which would open a practical way for perfect harmony, and for a very effectual method of performing work.

Mr. Rice: I presume one reason that the Commissions of different counties are not effective, is because the Supervisors have not appropriated any money for them. This county appropriated a sum for the expenses of the Commissioners and the Inspectors. This Commission has been in existence four months. We have written to every spot on the globe where they have the cottony cushion scale, or any other scale, for their remedies. We have received papers from Australia and India, and had correspondence with the Department of Washington and Professor Riley and his assistants, and we have compiled everything on that subject that we could get. Every man in Los Angeles City that has a remedy, and every man that has an orchard has a remedy (and a good many of them have different remedies to try), and we have seen the orchard where the remedy has been tried. The law does not compel any man to use the remedy recommended by this Commission on the start, providing he kills the scale bug, and this Commission has been only desirous of killing the scale bug, without reference to the remedy or the expense, except that we prefer it to be done economically on account of the orchardists. We have recommended two or three different things. We have changed twice; once from whale-oil soap to common brown soap, simply to cheapen it, and because the whale-oil soap spoilt the fruit, and our object was to kill the scale bug. We know of no remedy so far that we believe is better than the kerosene emulsion that is recommended by Professor Riley, and that has been in existence for several years. We have made some changes in the strength; we have added potash, and some use it with and some without. I believe I could name twenty remedies that will kill the scale, but the only point is to put the remedy on the bug. I believe that this bug is to be exterminated more by main strength and a great deal of awkwardness than by any particular remedy. I hope that the $1,000 reward that the County Supervisors have offered will call out a remedy that will in some way exterminate them, but I doubt about such a thing being reached—I doubt that I, or any of us, will live to see the scale bug exterminated in this county. I will tell you why: A and B, and you may go down to the last letter of the alphabet, will exterminate the scale in their orchards, but this diligent man, Z, he is always in the center, and he keeps enough to supply the neighbors. And about the time they think the scale bug is exterminated they are not paying so much attention to it, they are not spraying so often, and the first thing they know they have got the scale bug back again. This scale bug is on the ground, it is in the woods, it is everywhere. We have not found a plant of any description or kind but what it goes on; it seems to be fond of everything. Now, the remedy is, as I said before, everything. And it has really a comical side. We have tramped all over this town hunting these remedies. Only the day before yesterday a man came to our office, and he had a sure thing that would eradicate the scale—quite an intelligent man. We appointed the next morning at nine o'clock to be at his place, and we went down where there were two or three trees about as high as my head, and he showed the trees he had been experimenting on. He had dipped a feather in the remedy and touched each particular scale bug. This is a sample of the remedy. We could have killed the scale bug on that tree with a dish rag, because it was a very small tree; but they are not all dead on it yet. I could name a good many other such experiments. We have some other gentlemen here who are experimenting, and I would like to have them tell their own stories.

With respect to fumigating, a great many persons seem to think that by treating the tree as Mr. Rose suggested awhile ago, that they could kill every scale bug on the tree, and likely those on the ground under the tree; but I don't know what to say, to tell you the truth, except this, and that is vigilance and work. There is no trouble about killing the scale bug on the tree by the proprietor of the place, where he is interested and intelligent. He could make an emulsion, or he could apply hot water that is hot when it reaches the bug, or he could apply a hundred other different remedies to kill them and exterminate them; but his negligent neighbor brings them back again. He forgets that there are a few weeds that are infested with them on, while the rest of the orchard is clean, and he gets them back again. There is a little something about this that may be pleasing in this discussion. You go in the exhibition hall and I will show you the first clean fruit I ever saw in Los Angeles. They have all had a trademark. There are one or two samples that have that trademark still from orchards that have been thoroughly sprayed. We have calculations in our orchards from a reliable gentleman, who gave us the figures, that the difference in the price of his crop of clean fruit last year and what it was a year before, a good deal more than paid for the expenses of cleaning his trees, and paid him a handsome outlay over and above all the expenses. I believe if we could have a little show of the scale bug in the top of the tree, to keep the farmer continuously cleaning his trees, and make him keep the tree clean, those who grow citrus fruits may still find it an advantage, so that they might keep on cleaning if they had not a scale bug in the world. However, I am very anxious to eradicate this scale; but, as I said before, it needs intelligent work. If only one man did his own work it would soon be ended; but the proprietor goes ahead and makes experiments, and goes about his business, and the Chinaman sprays along leisurely; and I could tell you about a dozen orchards where the Commissioners dropped in to see how they were getting along with the work, and they were simply playing. The men knew nothing about the subject whatever. They were not spraying; they were spending the money on the orchard, but they were simply fooling. Frequently gentlemen would come along and say that stuff does not kill; and we have gone to see the orchard, to see what was the matter, and invariably found a man with a single action pump, and a Chinaman with a bucketful of spray, pumping it onto the top of a tree, thirty feet high; and, of course, it was not effectual.

Mr. Garey: What kind of scale was it on the tree? Where it was that the party figured that the improved price of the fruit paid for the cleaning?

Mr. Rice: The black scale; and we have an instance of the cottony cushion scale this year. They estimate that they can get a better price for the oranges this year.

Dr. Congar: I would like to add one word on the difference of materials, the reason why we should reject one material and select others. Caustic soda is used frequently to eradicate ulcers; it is used as a caustic in its full sense on the human flesh. Why? Because the moment that the pure article touches the human flesh it burns it and causes a scar; if you don't neutralize it it will burn to the bone. It don't stop there; it will burn the bone itself. It is literally a fire; that is the property of caustic potash or caustic soda. Now you understand the use of the material—why it kills. It touches the more delicate membrane of the animal, the cottony scale or whatever scale you are treating, and the moment you touch it it burns just as you burn the human flesh—it literally burns them up. Now you take kerosene, or coal oil as it is called, of high test; it is used by mothers about their children's necks for croup, diphtheria, and other things; you can use it upon your hand for a sprain as a liniment; it never burns; it will create excitement or irritation, but it has not the power of caustic soda at all. We want to make a distinction between the remedies we are employing, so that we can understand when we use it what we may expect from it, and make the strength accordingly, so that we do not kill the tree. The moment you touch the tree with the oil it will kill it; that is why I prefer caustic potash or caustic soda to all these other remedies.

Dr. Lotspeitch, of Orange: I am a practical man of seven years in the culture of the orange. I have watched the scale bug; that is, the black scale first; secondly, I have watched the red scale. I commenced to doctor the black scale bug and used Mr. Cooke's remedy—the worst character of whale-oil soap that they manufacture in San Francisco—and that didn't kill them. Mr. Cooke gave another remedy of using the commonest preparation of caustic soda, that is, concentrated lye, which costs 8½ cents per pound by the case, and only 50 per cent of caustic in it. He told us to use it of a certain strength; that strength would eat up the valves of the pump and almost make soap out of it. Next we commenced with the best article of whale-oil soap manufactured in Los Angeles. We used it one half pound to a gallon of water, to kill the black scale, and sprayed my trees. The next year I had a better crop of black scale than I had before. That was three years ago, and we spent considerable money then, and I assure you it takes money with the muscle. We then bought the best article of Los Angeles soap, and we used eighty pounds to one hundred gallons of water, and we sprayed in August, and we have not a single black scale that we can find on our trees. We had not had our attention drawn to the red scale, and still it was crawling in upon us, and we hardly knew we had it. We were using, as I say, eighty pounds of soap to one hundred gallons of water; that is almost a pound to the gallon, and it costs us considerable. It cost us over $1,500 to spray our orchard, and we had not killed the red scale bug, and the question arose, What are we to do? Lots of our brothers will certainly fail in the pocket. Muscle is good, but the money is getting low, so we must get something that will hold up the money part. The muscle is as strong as ever, the will as good as ever, we can spray as well as any man in the world, and I challenge any man to beat us in spraying the trees; but we found that didn't kill the red scale, and if it did we couldn't keep it up so as to exterminate them, so we must get something else. Soap is composed of potash and a certain amount of grease, that neutralizes the soda, and it is neither grease nor soda. Your soda does not seem to mix well with water and certain preparations, and you must find some remedy—some way of mixing this caustic soda as not to destroy its properties entirely, because that is the very remedy that will kill your bug. You use one sixth part or one tenth part of the soda that the Los Angeles County Board uses in its soap; you use it directly upon your trees, and it will kill the bugs and will not kill the trees, and you can reduce it down to a still finer point than that. We have sprayed this year three times with a preparation that we do not know will kill bugs or not. No man gives us a remedy that he knows that will kill bugs. Everybody has a remedy, but the bugs are getting thicker and thicker, and how are we going to reach them? I do not propose to tell you my remedy until I know it will be efficient, but this is the direction: Get the caustic or soda and reduce it down to that point that it will take effect upon the scale bug and not kill your trees, and it is the cheapest remedy and most direct remedy that can be used for the scale bug. I tell you the way we are working at it now will not accomplish the destruction of the scale bug. We have been washing three years, and have scale bugs still on our trees. What are we going to do about it? I say we *can* do it, but *will* we do it is the great question? If we can't do it right at once the best and the wisest policy, if we find we have made a mistake in planting orange trees, is to dig them up and cultivate something else. That is the way I look at it.

A DELEGATE: Have you tried kerosene emulsions?

DR. LOTSPEITCH: I have, sir. I have tried over thirty remedies. A man approached me the other day and said he had the very thing. "What is it?" He said: "Fumigating will do it." Three years ago I tried that. I took a tent and oiled it thoroughly and spread it over the tree; then I had the bugs of different classes and took very young chickens and put them into my tent. Then I built a fire and I ran the fumes into that tent. It did not kill a single live bug that I put in there, nor did it kill the little chickens, but in two days from the day that I did it the tree was as dead as a mackerel. That is fumigating with sulphur. I used the squirrel remedy also, and I never had any success with it; that is, I killed my bugs, but I also killed the tree.

Mr. Compere: I shall not say much on this insect question from the little experience that I have had. When I first started in on the orchard I have charge of, there were only about three trees that were infested. For a few days we thought we would eradicate the pest and say nothing about it. We went to work spraying our trees on the sly, and before we knew it there were some more trees full of them, and we could not keep it still any longer. Everybody wanted to know what we were doing, and finally we began to seek information, and tried this man's remedy and that man's remedy, and then I commenced to try a remedy of my own. I took a tent and placed it over a tree, and got a couple of my neighbors over there, and we burned about fifteen pounds of sulphur under there and let it burn for four hours, and I believe if a mule had stuck his head in that tent it would have killed him, and it did not kill the scale bug; but the minute I removed the canvas the sun struck the leaves and they turned white, and the wind scattered the leaves all over the orchard. We commenced spraying again and could not get rid of the bugs; there were always some left. Finally I went and I topped the tree off, and I scrubbed the trunk off with a brush and common soap. I have four hundred trees that I cleaned in this way and I can say are practically clean—that is, since last March. But on one side my orchard is full of them yet, and on the other side my neighbor's orchard is full, and, as a matter of course, they will keep coming back. From my experience I am satisfied you never will eradicate the scale bug otherwise than by taking and removing the top of your trees and scrubbing them down by hand. If you have to go to work and spray your orchard two or three or four times, the fruit is not going to pay for the labor.

A Delegate: Are you following out that system of cleaning out the bugs?

Mr. Compere: Yes; I intend to whenever my neighbor gets into the same notion; but if he don't, I will have his bugs coming over onto me.

Mr. James Bettner, of Riverside: I have listened with a great deal of interest to this discussion about the scale bugs. I fortunately came from a portion of the country where, at present, we have none, but we cannot expect to always enjoy that immunity. I have lived in this country ever since the scale bug first came here, and have watched its progress. It has been said here by several gentlemen that this pest has been increasing, notwithstanding all the campaigns that have been carried on against it. I think the vital point has been touched by Mr. Compere, who has just sat down; that this action, to accomplish anything, has got to be universal. Unless universal action is compelled by law, it does not seem to me that anything is going to be accomplished in the extermination of scale bugs. They may be killed, but a supply is always nearer or more remote from you, and it is going to come back. I must confess I would contemplate with a great deal of awe the cutting back of my orchard to nothing—destroying my crop for two years certainly, and probably more than that, with the almost certain apprehension that when the two years had elapsed the scale bug would be back again from my neighbors and I would have lost my two years' crop. Now, there have been many remedies suggested here, and, no doubt, they all are more or less efficacious, and there is no doubt that, by constant spraying one time and another, the scale bug can be kept in subjection. But the profit in fruit growing is not large enough at present—I do not know as it is going to be in the future—to justify the expense of $50 an acre, and from that up to $100, as I know some of my neighbors have spent in fighting scale bugs.

Mr. Thomas, of Visalia: I promised this forenoon to speak in reference to the matter of the saline mixture in regard to the destruction of the San José scale and to bring some samples of wood. I have them here, and by applying the glass you can see it was entirely killed; nothing left on it at all after this solution had been used. There had been a growth running out on these trees from eighteen to thirty inches, and by applying the glass carefully I could not find a live insect on any growth that had formed after the trees had been washed in a strong brine. This was found where a gentleman in the Central Colony, Fresno, had applied it on apricot trees and some peach and apple in August, and as far as I could see the remedy was effectual, simply using the brine as strong as he could make it. He applied it by taking a cloth and rubbing the tree; didn't use any spray at all. I do not know whether any person else has used it or seen it used.

A Delegate: I tried some salt brine on some trees of mine with the spray. It will remove the foliage from the tree; it will kill the tender shoots in the tree, and will not kill the bug. The only bugs I found it killed was where it was killed by the force of the pump; the force itself will do it, and you can do it with cold water if you have enough force. As far as salt brine killing them is concerned, it will not.

Mr. Milco: A friend of mine in Stockton, Mr. Beers, the banker, told me he saw in an article on the subject in one of our agricultural papers from the East, that by placing a handful of salt around the roots of the peach trees you would remove the borers. He was a little afraid at first, but he thought he would put on about one half of that and try it. He said in about three months there were no more trees. They were all dead. That is the result of his experience.

LAWS TO PREVENT SPREAD OF PESTS.

Mr. Milco: I would ask some of our lawyers as to the present law. They tell me the law has given a great deal of trouble. I think the present law is just as effectual as any we can make on the subject. The point is they have to enforce it. I say let us go ahead and enforce the law.

Mr. Wilcox: This is a very important question, and I think we cannot say too much about it. I believe we can destroy the scale. I have had my doubts about it at times, but last year I had two hours' talk with Professor Riley, at New Orleans, and he tells me positively you can kill any insect pest that ever existed, and those who heard him lecture went away satisfied that they could destroy that pest. The only trouble is, can you enforce a law, even if it is a rather troublesome and discouraging proposition? For instance, this cottony cushion scale appeared in Santa Clara Township three or four years ago within the limits of the town, and the trees were cut down and burned. The next year I saw them northwest, coming directly toward my place. They struck the square of the public school house, and I could not prevail on the Trustees to cut those trees down and have them stop right there. Finally they let them be cut and piled them up in the street, and strange as it may appear they did not spread more from that point. It is unaccountable to me why they did not. Those limbs which were piled up there were as white as if they were covered with snow. They were swept by the wind for months, and yet afterwards be less in that vicinity than there was at that time. Some of the trees have some on now, and then there will be a space where there is none at all. It is rather discouraging that we cannot enforce this law; of course, we have got to have a remedy, and I should appeal to the horticultural officer to know whether they are satisfactory to him. It is a question whether you can enforce any rule unless you can show a jury that it is a law founded in right, and that it has a practical bearing.

Dr. Chapin: In regard to the matter of insect pests, and the laws relating to the extirpation of them, it has been a serious question before the people of the State, for several years, to induce the various Legislatures of the State to provide suitable laws, under which this work could be effectually done. It has proved, in fact, that no Legislature which we have had that has treated upon these subjects at all has been willing to do all that was necessary in the matter to uphold the hands of those to whom it had delegated certain powers, but yet not sufficient to enable them to accomplish the work. Moreover, the greatest difficulty of all has been that there has not been a provision of money sufficient to secure the performance of work. It is, to a large degree, a matter of manual labor, and also mental labor, and the overseeing of the work of those who do perform the manual labor. The fact has been very apparent all the while, that there is a lack of money somewhere to pay these people for their services. If I may be permitted to express an opinion in regard to the whole subject in one word, it is not a lack of authority to proceed, in our present laws, but it is a lack of money to pay for the necessary work to be done. As has been already suggested, the great object in this work is to have it done simultaneously over a large section of country. We will take Los Angeles for example. This cottony cushion scale, so called (the *Icerya purchasi*, which is the technical and proper name for the insect, and it should be known as such), is now confined to a certain region of country. It does not as yet extend over very many square miles, but in order to have this work effectual in any instance the work must be done simultaneously over all the region of country thus infested by this insect, and in order to accomplish that there must be a provision for money for the labor to do the work. It has been truly said in this convention that there are twenty—yes, a hundred different remedies, any one of which is effectual for the destruction of this insect pest—provided that the work is done all at one time, and then that the insects will be reached by the preparation, whatever it may be that is used for their destruction. It can be done by manual labor; by many of the very cheapest insecticides, and by the most costly ones. It may be done by simply reaching every individual insect; and, of course, if a few were left untouched by any of these different preparations they are ready to propagate their species, and the tree and the entire neighborhood surrounding becomes infested again. I have come to the conclusion, deliberately, that it is not so much the particular preparation that is used, and I do not advocate any one particular preparation for that purpose at all. I care not what people may use, provided they will take something that will destroy the insects, and provided we all work together harmoniously for the accomplishment of that one object, and at one time. If people will ever be got to that point, and will proceed upon that basis, they can exterminate these various pests. Even the codlin moth can be exterminated, if it be done in that way; but the only way in which the codlin moth can be exterminated in this State, or in any locality which may be sufficiently isolated to prevent the spread of the larvæ from one point to the other, must be by the destruction of the fruit upon which this insect feeds. If that should be done for one season, the codlin moth would have no fruit upon which to deposit her eggs, and the larvæ when hatched from the eggs, having nothing to feed upon, would die. That is the only way in which that insect can be exterminated, though we may suppress it to a great degree by careful work. I might carry this illustration to many of the other insect pests. There has been no test case brought forward so as to determine by the process of the Courts to what extent our laws are constitutional or valid. It is not absolutely necessary that that course should be pursued, but if it is, there must be a provision of money to pay the expenses of carrying on such a suit. It has been often hinted and said that the State Board of Horticulture ought to do all these things. We have no authority given us by law to pay the fees of lawyers or the expenses of Court proceedings to test these questions. Individuals may take them up and carry them forward to such a conclusion, and that they have the privilege of doing, but there has been a general tendency on the part of all concerned, as far as possible, to avoid the trials of such actions. In this county it has been the desire and the intention, I believe, of those in authority, to avoid, as far as possible, bringing to trial these matters to see whether the law is valid or not.

Another suggestion I would make is, that there must be entire harmony prevailing between those in authority. There are State laws which are sufficient in their effect to carry forward this work authoritatively, fully, and effectively, and there are county laws and other ordinances; and where there may not be full harmony existing as to the methods by which work shall be carried on, it may cause confusion and disastrous result, instead of the thoroughly effective results that are desired. Now, I would suggest, as I did to the County Board of Supervisors of Los Angeles last summer, in meeting with them here, that they provide the means necessary for the carrying on of this important work in Los Angeles County, and that they work effectively under the laws which are already in existence; that by so doing the work may be harmoniously carried on, and possibly produce the results which we all desire. The State laws which govern these matters all recognize the County Government Act of 1881, which is still upon the statute books of the State. There is no conflict of authority between the provisions of that Act and the subsequent laws passed by other Legislatures. Of course, if a conflict should exist, then that in so far as that is concerned, becomes null and void; but wherein there is no conflict, work under that law can be carried on; and in order that the officers who are there named may be paid for their services (for no man will work without compensation in some direction for his services) I suggest that they work under their County Government Act, appointing County Commissioners, and these Commissioners in turn appointing local Inspectors from the number of quarantine guardians which had already or previously been appointed in accordance with the law relating to the extirpation of fruit pests, and in that way paying for the services of those guardians, and at the same time giving them a legal standing which would enable them to go without any warning or any request of any person, but by virtue of their own authority, onto the premises of any person and examine the fruit trees there, or any other trees that might harbor insect pests, and directing that they should be cared for—be treated in such a manner as might be prescribed, providing the parties themselves fail to do the work with any remedy that they might prefer previous to that. Now, I think this work should be carried on in full sympathy with this plan, and I think that we have all the legal authority that is necessary in the matter, and if money is provided in that way the work can be accomplished so as to give the utmost satisfaction to all the people of the State.

Mr. Shinn, of Alameda County: I had prepared a resolution which I thought of offering at the conclusion of the last discussion touching this point, and I will, with permission, read it, as it may form something of a basis for discussion, or, at least, it may limit discussion somewhat, since it is pretty generally admitted that the laws we already have are in the main sufficient to govern the case, provided we pursue the proper course; but if that be not so, and if the fruit interests of the State are what we suppose them to be, it is a matter of enough importance to occupy the attention of the Legislature. Perhaps after hours of discussion we may not arrive at anything more definite than to say that if the present laws are effective we will execute them, as it has been suggested by Dr. Chapin. There is a point that needs to be agitated, and that is the lack of money to carry out the laws as they should be carried out; and my resolution is simply to this effect: Resolved, as the sense of this convention, that we must have the money to carry out this Act, and the Legislature must authorize the counties or municipalities to make such appropriation under the cover of law. We must have the quarantine protection, and the men who are doing the work must be go-ahead, live men, with authority to do all they can to eradicate these pests.

THE CHAIRMAN: I would add two other points to this resolution, that is, that it is the sense of this convention that the scale bug can be eradicated; second, that this can be done only by universal and simultaneous action in the infested district.

The amendments were accepted.

MR. BETTNER: I would like to ask Dr. Chapin if, in his opinion, the fruit growers of this State could not ask the Legislature for an appropriation? I would like to offer a resolution, that it is the sense of this convention that such an appropriation should be made.

MR. GAREY: I think, if I understand the matter, we have a State law that provides for a quarantine, and provides for the Board of Supervisors, at the request of five taxpayers, to appoint a commission, and that the Inspectors appointed by such Board shall be the same parties—it being arranged between them—that is appointed by the State officer as guardian; and in that roundabout way they can get due compensation for their work from the Board of Supervisors from the several counties. It seems to me that the act of legislation that we need now is a direct law providing for the compensation of the guardians. The law is only inoperative because it does not provide for compensation. We need an appropriation by the State for the purpose of enabling us to exterminate this pest, and to ask the Legislature now to pass a law on the subject when we already have a law that we have never undertaken to enforce, does not look well.

MR. SHINN: It was not the object of my resolution to ask for a law that we already have; but, as explained by Dr. Chapin, it was that that law should be backed by a sufficient appropriation to put it into effect, and not by any roundabout method.

A DELEGATE: If I understand the law, it is effective and satisfactory; all we need is to have the backbone of our Supervisors braced up a little. We have filed our claims for our county, and it has been allowed out of the General Fund, the same as any other appropriation. Why should we go before the Legislature again? We have, under our County Government Bill, an amply sufficient law, the same as any other law. If Mr. Garey's horse has the glanders, the Board of Supervisors can appoint a commission and go and investigate that matter, and kill his horse instantly; and Mr. Garey can't help it. If we look upon this as a common nuisance, I think it is operative. All we lack is action on the part of the Board of Supervisors.

DR. CHAPIN: A fatal mistake was made in the matter by our last Legislature, in not making provision for the payment of the quarantine guardians for their services. It was against my protest that the bill was introduced in the manner in which it was. Senator Whitney, of Alameda County, introduced the bill, and knowing that he was to do so, I requested him personally to postpone the introduction of the bill until certain changes could be made in it, with reference to that very matter of providing compensation for the quarantine guardians (officers which it proposed to appoint), and stating that unless that was done it would prove ineffective—it would kill the actual work which it was desired to carry out. But Mr. Whitney introduced the bill the very next morning, the moment the President gave the opportunity for the introduction of bills; and no opportunity was given to any person to suggest any changes. Then the argument was used, and carried out by a number who were friends of the measure in the Senate and in the Assembly, that it would not be wise at all to attempt any changes or amendments to the bill, for fear that they might defeat entirely the passage of any bill that might help us. As I said in the first place, the Legislature haven't been willing to do all that was necessary; but they have done enough, so that in this roundabout way, as Mr. Garey has suggested, it could be still made effective, provided the Supervisors would do their duty; and I must say, without any qualification whatever, that Boards of Supervisors in the different counties of the State (and I do not refer to Los Angeles particularly, but I include that with all the other counties of the State) must be given credit for having done a great deal. They have devoted a large sum of money to that purpose, and I feel they should receive the thanks of the community; but there has been the disposition on the part of those of all the counties of the State to guard against the waste of money, and in their great care to guard against waste, they have permitted themselves to go to the other extreme, and haven't had the courage, the moral stability of purpose, to say that this money shall be devoted to this purpose. We, as fruit growers of the State, and taxpayers, have the right to demand that they shall do these things. There is where the greatest difficulty exists, in my mind; if the Supervisors of the different counties will furnish the money by their votes to carry on this work, it can be done effectively in the very way in which we are working, under the very laws that we have now.

Mr. Rice: In reference to the law that we have, and are working under in this county, it seems to be effective. We have not had a test case. We have not tried particularly to get a test case, but in three instances where we had determined to make a test, when the time came the parties having the scale bugs came out and cleaned them up. I wish to say one word on behalf of the Supervisors of this county, that they have answered the call of the mass meeting held in this city of the principal fruit growers of the county, asking certain appropriations; that they have, so far as it was possible for them to do it, met every claim and given every dollar asked for, though probably in not exactly the terms that were asked. The expense bills last month were something over $800. They were asked to offer a reward of $1,000 for some sure cure, and they did it at once. I simply state this in defense of our Supervisors, so that the strangers may know that we are in dead earnest down here, and I would say, also, in regard to the County Board and the guardians appointed by our State Board, the guardians of the State were appointed as Inspectors, so that we work under both laws, and we think that there is no doubt but what it is effective, and so do the people that have scale bugs.

Mr. Aiken, of Santa Cruz: In listening to this talk about the laws, it is very clear to me that the law is as good as it can be drawn; there can be no hope of an appropriation from the Legislature. I was up there during the time that this bill was under discussion, and I am certain that no appropriation could have been obtained—not a dollar. The theory upon which an appropriation would be asked would be that the City of San Francisco and the mountain counties, where they raise no fruit, should be taxed to kill the cottony cushion scale in Los Angeles, and the San José scale at San José. It is very doubtful whether the Legislature would ever appropriate money from all the taxpayers of the State for these local purposes; so the law as it is drawn placed the power to appropriate just where it belongs—in the hands of the Supervisors of the county. They know the needs of their counties, and they can appropriate the money belonging to the counties, and if this law is only enforced, I would say, go ahead; there are no obstacles in the way; take possession of a man's orchard by force if you choose. If he thinks you have damaged him, let him commence a suit himself for damages. Let him enjoin you when you take possession of the trees, and the burden is on him. You do not need any test case at all. They may carry it to the Superior Court and pay all bills; let him do it, but let us simply stand firm and make a brave front. As to the question about the constitutionality of the law, there is nothing in it. It is in the power of the Legislature to pass it, and no Superior Court in this State, as I should judge, would ever declare it unconstitutional. Sufficient unto the day is the evil thereof. That Act of the Legislature is constitutional until it is declared by the highest Court in this State to be unconstitutional. So that being the case, enforce the law; appropriate that money by the Board of Supervisors, and if anybody wants to fight, let them do the fighting.

Dr. Chapin: I would like to make an explanation in connection with questions concerning the Supervisors and their duties in this matter. While the Supervisors of some counties are in sympathy with this movement and are willing to aid by their votes or their voices in furnishing money for the carrying on of the work, yet there are other Supervisors of other counties that are not willing to give this encouragement. President Cooper has just told me that those of Santa Barbara County are not willing to do this. Consequently, while those of Los Angeles may be willing to do all they can in reference to carrying out this work of destruction of the cottony cushion scale, yet the Supervisors of Santa Barbara County, lacking in that intention and willingness, will continue the cottony cushion scale at Santa Barbara, and in due course of time—supposing we were honestly free from it here by our careful and expensive work—we would become invaded again by that pest from Santa Barbara. Going right to my own home, I might say almost the same thing with regard to our Supervisors in Santa Clara County. They have not been willing to do their duty in this matter of the insect pests, and there has not been a single Board of Supervisors since I have lived in that county that has been willing to undertake the work of providing any adequate compensation to the officers carrying out this work and which power rests with the Supervisors. I would be heartily in favor of a law in connection with this matter which should place the authority of directing the work in one body as the law now does in the State Board of Agriculture, but yet the Boards of Supervisors in the different counties seem to think that they have power granted them to provide ordinances under which they may appoint officers to carry on this work, and that their authority is only by the Board of Supervisors; that they do not recognize in any way the authority of the State law. There is one point of the clash and inharmonious action in the matter; I would favor law which should compel the Board of Supervisors of the different counties, where it is necessary to do so, to provide sufficient money by their votes to clear them from these insect pests, and giving the authority for doing all this work, or rather letting it remain just where it does, in the hands of one secondary organization that is legally constituted—in the State Board of Horticulture. If that is done, and the Supervisors recognize that authority, and being compelled to furnish the money necessary to do this work, we could very soon arrive at a solution of this problem of the insect pests.

Mr. Aiken: I want to say in reply to Dr. Chapin, that where the law authorizes or directs, say a Board of Supervisors, to do a certain thing, where there is no discretion, that they are to do a certain thing, the law points out a remedy for that—a writ of mandate would lie against the Board. It is a very simple proceeding; it could be done by a Superior Court, and it would be a question of whether a Board of Supervisors is above the law, or whether a Board of Supervisors will obey the law. They are not above the law of this State; they are not above the writ of mandamus, and it would be a very nice little case, and I would almost give $100 for a chance of trying it in the Supreme Court, and establishing the right of the fruit growers to command the obedience of the Board of Supervisors to the plain letter and spirit of the law.

Mr. Bettner: Can you compel the Board of Supervisors to make any appropriation?

Mr. Aiken: Where the law allows a discretion, the Board of Supervisors to a certain extent is a legislative body, but when they become executive officers the law points out that that Board shall do a certain thing and they have no discretion, and I think a writ would lie. I have not examined the matter of late, but I think it is a clear principle of law; but anyway, try it, demand the writ, and I think the Courts would issue the writ, and then it would come up on its merits of whether the Board of Supervisors can oppose the proper execution of the law passed by the Legislature of this State, or whether they can decline to make the approriation that the law points out that they shall make.

Dr. Chubb: It is not only what can be done, but what will be done. A man that will go and attack the Board of Supervisors in the manner described is a difficult man to find. It is sometimes just as easy to coax as to force. Our own Board of Supervisors, as has been explained by Mr. Rice, when we approached them and asked certain things done to carry out the law, said: "We will do whatever the public sentiment requires or asks." We met in the southern part of the county, the Santa Ana Valley, and circulated a petition and got over three hundred names asking the Board of Supervisors to enact the regulations or ordinance under which we are acting in this county, and they at once acceded to that request, and I believe we have got as effective a Board of Supervisors in that direction as will be found in any other county in the State. Now, if the Board of Supervisors have any power, they get it from the Legislature. Granting that the law is all right, if the Board of Supervisors feel that the enforcement of the law is to the interest of that county, and that the fruit interest is the interest that they are bound to respect and support, they will then at once make it their work. Why not? They are the servants of the people, and the most prominent interests of their county are the ones that will enlist their hearts and hands, and are the ones they are the most ready to support. All they want is the expression of public sentiment, and that is the reason I offered the resolution, and I believe it is the duty of this convention to make this expression, and to show that we want the backing of the law and of the money influence to protect the fruit interests of this State, which we believe to be the coming interest.

Col. Webb: I had not intended saying anything on this subject because it is really one that I have given, perhaps, less attention to than almost any other, for the reason that it has not been my duty to consider it as much as other questions, but I have considered it enough to see the many difficulties in the way of enforcing the law. I am compelled to differ from Dr. Chapin and my friend Mr. Aiken. They seem to think, one that the law is proper and all that is necessary, and the other that there is no difficulty whatever in enforcing the law. Now, the law says that the Board of Supervisors *may* appoint quarantine guardians who shall receive so much per day for their services to be derived from the damages assessed upon the party whose property is condemned. Now, a man, to obtain money in that way, must be a more abandoned creature than I believe is in this hall this evening. I doubt very much whether my friend Mr. Aiken would willingly take the position of quarantine guardian in that beautiful locality of Wright's Station, and there enforce the law and condemn a man's orchard and say: "Mr. Jones, your trees are infected, and I require of you to cleanse them immediately, and if you don't do it I will cut them down, and I will compel you to pay the charges and costs of this action," and then when the man refused to do it, as he probably would, because they are stubborn people, some of those fruit growers, then enforce the law and have the property attached and sold and the money realized from it. Now, Mr. Aiken, if you would do that you would never want to run for County Judge in that county. Then there is another thing: It has been said that the law provides that the Board of Supervisors should do a certain thing; that it is obligatory and mandatory, and they are bound to do it; that they must not suppose that they are above the law, etc. Oh, no; nobody supposes that they are above the law, but the question is, as in the other case, whether Mr. Aiken or anybody else that desires to live a quiet and peaceable life and meet his fellowmen on good and social terms every day; whether he wants to go to work and be the instrument of enforcing that; I doubt it very much.

A DELEGATE: The new Constitution has given ample power to the Board of Supervisors in any matter that interests the county, to make the allowance and levy taxes on the citizens where it may be necessary; they have a right to pass a no fence law, they have a right to regulate the school taxes, and anything of that sort that concerns the people they can do, and in the new Constitutional Convention that thing was discussed thoroughly, and if we have a nuisance here of any kind the Board of Supervisors have power to levy a tax on the people to eradicate that, but then you have got to leave that to a vote of the people to see whether they ratify it or not. But the Board of Supervisors have got the power in each and every county to levy a tax on its citizens, is the way I understand it.

DR. KIMBALL: With all due deference for the enthusiastic member who comes from the Santa Cruz Mountains, where they raise such tremendous apples, and where they insisted for a long time that the codlin moth could not live, I can say there is an unlimited field for his work at home. The question, after all this discussion, resolves itself down to the simple proposition, whether the people themselves in every locality are so intensely interested in the work of getting rid of these insects that they will carry it into politics, that they will carry it into the election of the Board of Supervisors, that they will carry it into the election of Judges, and so interest the body politic that they will be willing to act in response to their request. That is all there is for the suppression of insects, for the people to act unitedly and sincerely, and as if they meant business. That is the only solution I can see.

The resolution as amended was adopted.

A letter was here read from the Los Angeles Produce Exchange, extending the privileges of the Room of Exchange to the members of the society; also a letter tendering a similar courtesy from the Los Angeles Board of Trade.

On motion of Dr. Chapin, a vote of thanks was tendered to the Produce Exchange and to the Board of Trade for the courtesies thus extended.

Here the convention adjourned until Tuesday morning, at ten o'clock.

The convention, on the morning of the second day, was called to order by President Cooper.

COMMITTEES APPOINTED.

The Chair appointed committees to judge of the fruits on exhibition in the hall, as follows:

On Citrus Fruits—Thomas A. Garey, of Los Angeles; James Bettner, of Riverside; J. M. Gray, of Chico.

Deciduous Fruits—Sol. Runyon, of Courtland; Col. E. E. Edwards, of Santa Ana; S. McKinley, of Los Angeles.

Miscellaneous Fruits—A. T. Hatch, of Suisun; I. A. Wilcox, of Santa Clara; George Rice, of Highland.

FRUIT MARKETING.

The Chairman announced the topic of discussion for the morning hour: "The Care in Selection, the Kind and Size of Packages, the Marketing and Shipping."

Mr. Webb: I have a box here from Mr. Coronel, which was sent to him at my suggestion from the East, which is recommended by Parker Earle as the best box which has ever been used in shipping fruit; it is here where all persons interested can have an opportunity to examine it. I should never have thought of sending for anything that was advertised had it not been for the recommendation of Mr. Earle, knowing his reputation as one of the leading fruit packers of the United States, and as a gentleman of the highest integrity. It is here for you who desire to do so, to investigate it. [The box was made of slats. Inside there was an arrangement of pasteboard, very much like the patent egg carriers, each fruit being given an apartment by itself, with holes for ventilation.]

Mr. Wilcox: I have been shipping small fruits for the last twenty or twenty-five years—blackberries, strawberries, and the like—and I would like to look at that box very much. In importing plants, or anything of that kind, where they go a great distance, they build openings at the top. I have had plants shipped to me, forty varieties of strawberries; every one of them came dead, because there was no current of air inside. I had them duplicated afterwards and all came through in a healthy condition where there was an opening at the top. The box shown by Mr. Webb seems to have the principle of ventilation about it. [Explains the construction by illustration of the box itself.]

Mr. Webb: It obviates the necessity of wrapping; you get fruit of the right size, and select them with reference to the cells, and it obviates wrapping.

Mr. Garey: Is this a new package, or one that has been used and tried and proven by persons that have tried it heretofore?

Mr. Webb: I think that the letter Mr. Coronel has from the manufacturer is acccompanied with the statement that Parker wrote to that effect, and that is the best answer to the question.

Mr. Hussman: While I do not know anything about this package, and seen it for the first time now, I know a good deal of Parker Earle, and say this—that anything he recommends he has tried, and wouldn't recommend it otherwise.

Mr. Williams, of Fresno: This matter of the package is a prominent one in reference to shipping fruit; if we get a package for the proper carrying and the proper handling of our fruit, we have overcome a great obstacle in transporting of the fruit of the Pacific Coast to the great centers in the East, which is really our market. One of the great points of the shipping is in the exorbitant cost of the package. For instance, in packing a carload of grapes for Chicago or Kansas City, or anywhere else East, the mere cost of the package is more than the original cost of the fruit. If you put your grapes at $20 a ton, which is very low, the packages and the loading in the car will cost you 240 odd dollars. The great point in shipping is to lower the expenses. Our grapes are cheap enough; we have the consumers on the other side, the transportation and the package figure very largely in the general result. I have tried grapes in four-pound baskets, and it works pretty well if you do not have any delay on the road. For the carrying of pears, we have used forty-pound boxes. They are not a success; you have to spring the tops on too tight and too hard to get them there in proper shape. Mr. Porter told me he could spring them on so that they don't shrink a great deal; but novices in the business get them about half full. Now, we want a package in which we can get them there in presentable shape. Another thing, the package, as it stands to-day, creates too much pressure on the center layers. We must have a taller package, and one that will not cost us too much. For other fruits, the smaller you have the package the better, to obviate the pressure on the fruit.

Mr. Garey: In Southern California perhaps the most important question in the matter of shipping fruit is the shipment of the fruits of the citrus family. We are looking for a superior package to the one we now use, and we will hail it with delight. The main point in shipping oranges is to prevent them from rubbing or chafing one another, as Mr. Williams said as to other fruits, getting loose in the box, and in picking up the fruit shaking it about and bruising and damaging it. The boxes shown appear in the first place to be cheap; that is an important point. We want a cheap box to ship our fruit in, as well as a cheap remedy to kill the scale bug, and these boxes, as they are made there, it strikes me, that unless the oranges are selected and sorted especially to fit those spaces closely and snugly they will necessarily shake about, and that will bruise the oranges and destroy them. All the spaces that do not fit would have to be filled up with paper, or something that would make them fit snug and close.

Dr. Chapin: After closer examination of this package as it appears here, it seems to me it would be rather a slimsy affair; the very slightest touch will rack it in various directions, with a single nail in the laths, which are on the side. I should think the package would be very likely to fall to pieces, handled in the way in which fruit is in this country, or on any long journey. I should rather be afraid of the package myself, from the appearance of it.

Mr. Garey: I suppose those compartments are not arbitrary; they can be changed to suit the size of the fruit.

Mr. Webb: That is what I tried to state, that they have boxes of different sizes and cells, to accommodate the different sized fruits.

Mr. Milco: My opinion is, that if that can be made strong enough, it would be one of the best things we have, for the simple reason that in order to bring our fruit before the public we must have it of different sizes; this idea of putting a layer of good fruit on top and small on the bottom ought to be done away with for the sake of our future prosperity, and that little box strikes me as one of the best things to accomplish that purpose. You can't put a big orange in a small space; you have got to have it of the size to fit it, and then those packages ought to be marked numbers 1, 2, 3, or 4, or whatever the size is, and the fruit will sell accordingly. The main point is, as Chapin says, as to the stability of the box. I know that when you put forty or fifty pounds of fruit in a box it has got to be pretty strong, the way freight and expressmen handle boxes. They don't care how they handle them because they have no interest in it, and unless a man watches them or ships himself and places it on the cars himself, the chances are that the fruit, when it gets on the other side, is not fit to do anything with.

Mr. Wilcox: I think that the objection to the box that is here referred to can be very easily remedied. I have shipped fruit myself in a box similar to that, merely with a flat thin piece of board between the layers. The way we did, we braced the box by nailing a cleat along the outside at each corner. We took common laths and nailed it right over those places, and one at each corner and one at the end, and I never had any complaint, so far, as to fruit moving around in those compartments. The difficulty can be remedied easily, too, by taking a piece of paper; of course, the fruit ought to correspond in size, nearly, to the cell. One thing I want to say in regard to the shipping of fruit here: It must be handled carefully, and the railroad hands do not do so. They throw our chests off twenty rods from where we want them. I paid the railroad company, fifteen years ago, $1,000 freight on strawberries at 80 cents a chest, and sometimes I would have to go ten rods away from the depot to get the chests. When I passed through Florida last winter, I saw a circular of the railroad company as to shipping, and especially requesting that any carelessness be reported to headquarters. And yet, on this coast they are proverbially rough in handling the fruit. I would never ship fruit anywhere without putting it on the car myself, or some party who is interested in it themselves. That is the only safety you have. Mr. Block, who ships the most pears in Santa Clara County, don't trust anybody to attend to it for him; he has his own packer and his train shipper.

Mr. Chapin: I am very glad the point was brought by Mr. Milco, regarding the size of the fruit throughout the entire package, and not a fine layer at the top, and then the balance of the box made up of inferior fruit of all sizes and descriptions. A little personal experience in that matter may not be uninteresting to the members of this convention. Owing to the necessity of my being absent from home almost all my time, it is an absolute necessity that the details of my orchard work be left to hired help entirely; and my experience has been this, that however honest and faithful men may intend to be, and frequently are, yet they are oftentimes careless in their work. It is not as though the eye of the manager or the owner was upon them. Only the other day some packages of fruit sent to the San Francisco market were called to my attention, when in the city, and I was told that they came from my orchard. The box was opened on the side and shown to me. I said that never came from my orchard; my fruit is never packed in that manner. They assured me that it was so, and I became convinced that that was the fact. When I went home I opened some boxes that had been packed by my foreman in that same manner, and found precisely that description of things existing, notwithstanding I had repeatedly told him that it would cost him his position if he practiced any deception in the packing of fruit. I had positively forbidden him, giving the most arbitrary instructions against anything of that kind, and yet, in the face of all that, the work was done in that way to a certain extent. Fortunately, it was but a few packages that were done in that way; but the man's excuse was that the fruit was there, and he thought that he might as well make use of it, and get what he could for it. It is needless to say that that was not repeated; but this very method of packing, in certain sized partitions, with one class of fruit through the entire box is a most excellent one, and that part of it is to be commended most heartily; and if the cheapness of the box, and the strength and the stability of the package, can be secured at the same time, so as to be profitable for the fruit growers to use, there is no doubt but what it would be a most valuable article.

Dr. Frey: It would be a very easy matter to have it made so. If the boxes were going a short distance, it would do very well; but if they were going further, you might have to put in a few nails, and they would go along very well, or, as the gentleman remarked, you could put slats in on top of it. You can put a slat on each end, so that the pressure in the box would come on the slats instead of coming on the top of the box, and that strengthens the box very much. In regard to grading fruit in the box, I think it is a matter of great importance, that it should be insisted on by the society that every man should have his name on the box, and be personally responsible; and if a man puts in poor fruit, let him take the responsibility, and let everybody know who it is. The difference will soon be apparent.

Mr. J. M. Gray: I would like to hear from somebody who ships fruit to Chicago if they think peaches could be shipped in that box, without rubbing. If so, it would save a great deal of trouble to the shipper. We know it is no small task to get a carload of fruit, and wrap each piece in paper; and I fear that the paper that we have now in this State is not the right thing to wrap peaches in, especially if they become the least bit moist. There seems to be a taste of the paper in the fruit. If we could arrange some way of shipping, without going to that expense and trouble, it would be a good thing.

J. M. Hixson: I have a great many letters from parties whom I have been doing business with this year, which I expect to lay before the fruit shippers and give them my advice in regard to a great many matters pertaining to shipping. In regard to Mr. Gray's remarks as to shipping peaches, I think it would be good if they would contract those spaces considerably to have the fruit fit. It may not be generally known that the fig, in the green shape, can be shipped through in good order. We had them from several different parts, and only, I believe, in one instance did they come through in good order, and that was when there was but one layer in the box. They sold at extravagantly high prices, and demonstrated to my mind, that whatever package was successful, the cost of it would form but a small item if we could get the fig there in perfect order. The peach, too, at times, of course, will sell at a price in which the package would hardly cut any figure. In regard to the strength of the package, that is one thing that I want particularly to call your attention to. I have a number of letters, and I will read an extract from one to show the sentiment on the other side in regard to the package. In case of getting a light package, a pound or two, or three or four pounds, to get that package strong enough so that it does not fall to pieces, is no consideration. We have one car of plums in which the stanchions parted. They were put into an old-fashioned car and arranged to give ventilation, and when they gave way the bottom of the fruit slipped forward and threw it on an angle, and the package was so light that a good many of them burst and the plums ran out. In such a case the cost of the packages was a very little consideration. I will read this from Boston: "I hope your friends in California will see the necessity of stronger packages. We consider this fault one of a very serious nature, and the sooner it is remedied the better it will be. For short distances no doubt they are 'O. K.'" You see, he says it is a very serious matter in regard to the packages, for he finds the fruit comes out of order in consequence of the package being so light that it springs. Now I have one from Hamilton, Canada, in which the gentleman speaks on the same matter of the package. In regard to putting the small fruit on the bottom, anything of that kind is not going to take in the East, because every package there is opened. They open the package, or they put their hand on it, and they have become such experts that they are satisfied if it doesn't give, and if it doesn't they then sort it out and find where the defective ones are and then take and supply them with fresh fruit; or if it is not packed tight enough they draw them together and put in fruit enough to fill up the package, so that a man who is shipping with a view of success is not going to put in poor fruit or inferior fruit more than once or twice until he will see that it don't pay. There is no place I have ever done business where a man's name is worth so much to him as it is in the eastern market, because they go right after him. As soon as they find an article is well packed they seek for that brand, and when they say I will give you so much for that mark they don't mean I will take all of it; they mean I will give you so much for the privilege of going through it, and if it is not all right they are going to reject it. It is no use to put up inferior fruit, or overripe fruit, or anything of that kind with a view to success. There is another important thing, and that is uniformity of package. If you are going to have twenty pounds in a package, have twenty pounds; if you are going to have forty pounds, have forty pounds of fruit. This is for two or three reasons. One is, that a man makes a calculation when he sends it out for retail how many pounds he is going to sell. Another is, that the express companies take their fruit at a certain rate per box. They cannot take any five, or eight, or ten thousand boxes and distribute them to the different places and weigh the different lots; they mark them if it is peaches or plums; they take them as twenty-two pounds; if they are pears and apples and things of that kind, they take them at forty-six; so that if a man has got eighteen pounds of plums, you see he is paying the extra expressage on it, and all those things are taken into consideration.

Mr. Aiken: I will say as to the redwood box, in the County of Santa Cruz we buy them at two cents, peach and grape boxes, and we can manufacture enough to supply the State of California at that price. As to that box, it may be of great value to us in the State enterprise which you hear about. We propose to do one thing if nothing else; we propose to manufacture the best boxes that can be obtained for the actual cost, and sell to fruit growers at the actual cost; and what can be manufactured for twenty cents you will get for a little more than ten cents.

Dr. Chubb: As to orange boxes, when talking about it in the East this summer with a commission man, and when I told the cost of the box, they said you can do better than that by shipping your boxes from Maine by sailing vessels during the seasons when you don't want them, and get during the fruit season. He spoke very confidently about it.

He said he was confident we could get our supply of boxes much cheaper than 16½ cents, which we were paying for orange boxes.

Mr. Milco: I will give you my opinion. I know that one firm in this State is shipping a great many carloads of lumber around the Horn to all the eastern ports, and it has been done for the last two or three years, and I have been told by Mr. Smith, of Stockton, that the lumber is so cheap in California that they can't make a cent out of it, and the only money they are making is by shipping East. You can imagine as to that, if they ship around the Horn from Oregon and Washington and make a profit.

Mr. Chubb: Then they ought not to charge 20 cents for orange boxes.

Mr. Congar: I think the boxes made in Maine are made of birch, and not of pine. I was told once that they could be bought in Maine for 7 cents. Mr. Wood can inform us on that point. Did you not write to Maine?

Mr. Wood: Yes, sir; we have received prices from so many different places, but I can say this as to that box. When we were in business here, shipping a good many, we could buy our cases in the East, and pay our freight on them, and lay them down here for less money than we could get them from San Francisco. In my experience those boxes can be bought in the East and brought out here by freight as cheap as they can be manufactured at home by our present manufacturers, unless they have improved during the last two years.

Mr. James Bettner: I was in New Orleans last year, and inquired as to the cost of the Florida orange boxes. They get the most of them from Maine, and I found that the Maine boxes, coming by water transportation, cost about what it costs to deliver Truckee boxes at Riverside (about 14½ cents); and the Maine orange box is to me a very unsightly box. It is made of basswood, is very thin, and has to be bound with hoops, and it warps all up and out of shape if exposed to the sun or air at all. They have found so much fault in Florida, even, that they use a local box in some places there, and are turning out a pine box that is a good deal similar to our Truckee boxes.

A Delegate: I think if you can ascertain the lowest price you can secure these boxes in the East, and then will examine the boxes made in San Francisco and on this coast, and the prices, you will find that we can procure boxes, or anything else in the wood line, a great deal cheaper here than you can procure it anywhere on the eastern coast. Only a few weeks ago I was up on the Canadian Pacific Railroad at Victoria, and they were very much agitated there on account of the Dominion Government assessing the lumber there 8 per cent ad valorem, and 25 cents a tree for their lumber, and they sent a remonstrance back to the General Government, trying to overcome that, saying it would ruin their market in the lumber line, and prevent them from competing with the California and the Puget Sound lumber country. Now, we have box manufacturers and everything in this country, and we have the wood. There is wood enough in Eureka, Humboldt County, to make boxes and box up all the fruit, and the trees, and everything else there is in this country, and we can furnish them just as cheap as we can get them from Maine or anywhere else in the world, and just as good; and I will tell you that I think it will be to our best interests to keep this money at home. We have bright prospects in this country, and I think any one can see that it is going to be the distributing point for all the southern country. It is so recognized by all the railroads in the country. If we look a little to our own interests, without sending any money abroad, I think we will all fare a great deal better. I do not disapprove of ascertaining what you can procure these things for.

While I was in British Columbia a man started some soap works. He sent to his neighbor, a block or two away, for boxes. He said: "I will charge you 15 cents apiece." He says: "Send me one thousand boxes." It so happened that there was one of Hobbs' men there. The soapmaker told him his trouble, and he says, "I will send you up some boxes." And he did send them from San Francisco, going the trip by sea to Victoria, just one week before he could get them from a block away. That would show you if it need that the work can be done just as well here as anywhere else, and as good as any you can get abroad.

Mr. Wilcox: I live where we make boxes, in San José. One thing should be borne in mind. In the first place, all the best timber that is used for boxes, from chests down, was held by a combination. When I bought my first blackberry chests, twenty-five years ago, I paid $9 for one hundred chests. I can now buy those chests, of a better quality, for $3. We had no machinery to make a good chest; now we have machinery in San Francisco that will dovetail the corners in the best possible manner. We have the same in San José. I have paid for strawberry boxes, to hold eight or ten pounds, 11 cents; I get them now for 2½ cents. I can buy the common strawberry box, holding a pound, for eight tenths of a cent apiece; that is all it costs for little raspberry baskets. So far as that is concerned, we have been making them there in San José as cheap as can be made anywhere; lumber is much cheaper than it is in the East. We can make a box cheaper than any part of the world. Our redwood lumber is even being sent East to be manufactured. In New Orleans they all wanted to know what it could be got for. They use it to make coffins. They are making coffins in Santa Clara by the quantity. We are supplying all this coast, the Sandwich Islands, and Mexico, and all this country with them. We don't want eastern lumber. When we have machinery in competition, that is all we want. I wouldn't look to the East for a box hereafter, and I don't think we will need to. It may be that we will want to combine with this organization on shipping, and that we will want to make our own boxes; and I believe they can be made here cheaper than anywhere in the world, for there is no part of the world where we can find lumber so accessible.

Dr. Congar: I don't think there is a question but what boxes can be made here as cheap as in any part of the world. That is dodging the point. We want to know whether they *will* so make them; that is what we are after.

Mr. Milco: I think that the fruit interests of Southern California are so extensive that the fruit growers of this State are strong enough to go to work and make their own boxes. If they cannot get them cheap enough, they should put their shoulders to the wheel and go to work and put up their own factory and see what they can do, and I think they will find they can get their boxes very cheap.

Mr. Hixson: I think we are losing sight of the main point of this matter, which is ventilation of the fruit more than the cheapness of the boxes; and while we discuss the latter part of it, we ought not to pass over this very important matter. You see the box which is shown here is ventilated from below, and the vapor or moist atmosphere rises upwards through the fruit. I want to call your attention to one fact demonstrated in the receipt of some cherries we had this year in Chicago. We had one carload, in which there were about seven hundred cases, shipped in the ordinary crate—such as are used in the shipping of grapes; and, by the by, I would not by any means recommend that as the proper package for cherries. I do not suppose there is any man who would have paid $100 for the carload of cherries at the depot when they arrived. We, of course, have to pay freight anyway, even if the fruit is all ruined. We have given bonds for that beforehand. There were fifteen crates in that lot that the man had stretched brown paper over the top of the crate so that the paper was about half an inch above the top of the cherries. On top of that paper was laid the slats, so as to prevent pressure coming down to mash it. It was arranged so that there was a space between the cherries and the paper, and a space between the paper and the top of the crate. In one of those crates the paper had got torn and fell down upon the cherries. That was like the balance, covered with fine mold, of a thin cobweb appearance. The other fourteen crates were in good order. There was no other crate in that lot that we could ship outside the City of Chicago. By taking the tops off the boxes and exposing them to the air, this cobweb-like mildew passed off of a great many, and the local buyers bought them, and we got about $800 out of that whole carload. That paper absorbed the moisture that arose from the bottom or from the cherries, and the cherries were in good condition. A good many of the cherries and other fruit that were not wrapped had so much moisture on the top of the boxes that it was absorbed by the wood until the top was discolored. Now, if a fruit box is ventilated so that this moisture can pass off, it seems to me it is of vital importance. So far as the box business is concerned, none of us doubt but what we can make them as cheap here as anywhere else. The only question is, do we do it? I had some occasion to get some boxes in Chicago, and paid for the first lot of white wood, twenty-five pound boxes, 8 cents, and then got a bid from three different parties for twenty-five pound boxes, clear pine, at 7 cents, and then made for 6 cents. I had occasion to have some figs packed the other day in San Francisco, and the man who packed them assured me he had to charge so much, because he had to pay 9 cents apiece for the same size box, and I remonstrated with him, and he tried to get them reduced. He said he could not get them less than 9 cents. I have no doubt but what they can make them here just as cheaply as anywhere else; but the question is, do they do it? But the main question, as I have already said, in this matter, is ventilation.

GATHERING AND CURING FRUIT.

The Chair announced the second topic of the day: "The Proper Time to Gather the Different Kinds of Fruits, the Curing, etc."

Dr. Congar: I rise to make a few remarks upon that subject, in reference to the orange and lemon. I know very little about the deciduous fruits that are growing in Southern California at this time. When I came here, ten years ago, I paid 10 cents apiece for apples raised in Oregon, $1 a pound for butter made in Sacramento Valley, and everything in proportion. Now the local production of such articles is abundant. I have had some experience in regard to handling the oranges and lemons, as to their condition of ripeness, and their effect when picked under certain conditions. I will speak of the lemon first. I paid more attention to that than the orange. It is a well known fact that the lemon in this locality requires certain treatment in order to produce a fruit of first quality. I may say, first and foremost, soil has something to do with it, and something in the matter of treating the trees as to the amount of water the tree is to get, etc. I would speak of the lemon as it is taken from the tree, and as far as I go I speak of the Eureka and Lisbon lemon. They have in the San Francisco market a lemon called by the commission men there the "California Sicily Seedling." I rebel against that name. We have no such lemon in this country. We have a Sicily from the bud, and it is as different from the seedling as can be. The lemon I wish to speak of is the Sicily bud, the Eureka, the Lisbon, and the Genoa. Those lemons, under the treatment I have pursued, will produce a lemon that we challenge the world to surpass. I am willing to put up one hundred boxes against one hundred boxes imported lemons. The lemon wants to be slightly colored on the tree before it is picked; it wants to receive from the soil all the properties that will make it perfect. It must be picked at that stage with the best of care, without much handling. I mulch my trees with straw and lay the lemons immediately under the tree. It matters not whether it is damp or dry. Of course, if it is a dry portion of the year, I leave them there a less time than though it were a damp season of the year. They will remain under the tree for weeks if it is a moist atmosphere. I don't place them over two or three inches deep, and they will cure down into a lemon which I will challenge the world to surpass. By this process the skin loses moisture, and becomes soft almost as a glove, but it is hermetically sealed. There is no chance for the oxygen of the air to penetrate that rind, and it is the oxygen of the air, as we all know, that causes the decay in all fruits. If you keep out the oxygen from the fruit it will never decay. Hence, the necessity for picking our fruit with a great deal of care. If lemons are handled as I have described, you need have no fear of foreign competition. Now, as to the orange: I find it to be an advantage to pick the orange with some care, and allow them four or five days to shrink; that is, to lose a surplus of moisture in the rind. It is when the rind is distended with this surplus of moisture that scraping it with the finger in picking will rupture the rind, and the oxygen of the air takes hold of that little spot. It commences to decay. Hence, you want to pick them with this care, and put them in a box, and lay them away under the tree, and let them shrink for three or four days. It depends somewhat upon the ripeness of the fruit. They should be in such condition that when they are put in boxes they will not shrink and become loose, so that every time the cars shake they knock one against the other. There is a secret of great loss in our fruit shipped to the eastern market. If they are shrunk before they are packed, you can pack them just as tight as you can pack an apple, and they cannot give in your boxes. If you will go ahead with the sorting practice, you can pack them so tight that they will scarcely move in transit to Chicago.

I rose to give my experience in picking off the tree. Those who buy the fruit off the tree, and pick and pack them under the tree, huddle them off to the railroad the next day; they throw them just as you throw sacks of potatoes. They take them up in boxes and throw them on the wagons, and I have seen the juice run out of those oranges as they packed them. That is the way some of the commission men handle our fruit, and we suffer in consequence. That is the reason why I am in favor of some kind of an organization, either Southern California or Northern California, so that we may stop this terrible work. If, when we pick the fruit when it is ripe, let it lose the surface moisture, and pack it closer, we will get along without much loss. We can raise as good fruit as any in the world.

Mr. Hixson: I would like to say one word in reference to Dr. Congar's remarks in regard to picking the orange and letting them lie awhile. I think there is so much point in that, that every one ought to pay some attention to it. It is very well known that there is no man in California who is as successful in shipping apples as Mr. De Long, of Marin County. At his place they pick their apples in a box, one third larger than the box they pack in, and they put it in an apple house and let it stand there for a given length of time that may suit them, but not less than a week or ten days, and pack it from that into the boxes that they ship in. They ship to Australia and New Zealand and other distant markets with perfect success, and I think that it is because they let the extra juice pass off in evaporation. I think the doctor's remarks on that point are worthy of a great deal of consideration.

Dr. Chubb: My experience does not agree with the doctor's theory completely. This last summer, in the month of June, I had sent to me in a western city, two or three carloads of oranges that were sent on rather as an experiment. They could be bought very cheaply in our section of the valley, because they were the remnants of the orange crop, had ripened up later and had to be picked up later, and a great many of them were very ripe, and wouldn't be considered fit for shipment on that account. They were picked indiscriminately, believing that they would at least pay the expenses, and were packed rapidly without due care. I saw them as they were opened in the commission houses, and from the very fact that the skin had dried, they came through in better order than oranges that I shipped in March. That experience convinced me that we must cure our oranges before shipping; they were dried on the tree.

Mr. Rose: I have had various experiences with shipping oranges and in picking lemons. I have spoilt more lemons I guess than any man in the State of California in experimenting, and I feel very sure that Dr. Congar is very correct in all that he has said of his own knowledge as to the lemon business. I have no doubt, it is true, not only to me but to everybody who has lemons. As to the orange, I have had a different experience from Dr. Congar. Last year I went upon the theory of picking and keeping my oranges two or three days under cover in a large building that had the ventilation of open doors and open windows, but oranges which had been in there would not keep as long as those packed out in the field and shipped at once. I have found that oranges that are kept out of doors will keep better than those which are kept in any kind of a house, no matter what kind or what ventilation. So far as the orange is concerned, there is a necessity for the people of this county, especially, to find some way of cleaning them, and washing oranges has had the effect of making them decay very easily, although there are modifications I think in the practice which did not result that way. We have tried to rub them off with a brush, and if immediately shipped they will decay very quickly—much more quickly than if they had not been rubbed. It is the same way with the washing. We have in our neighborhood a very painstaking gentleman, Mr. Dobbins, who washed his oranges last winter and kept them out-doors, with some protection of shade, perhaps, and they went as well as if they had not been washed. It is my belief we ought to have a drying-house, and I believe we will come to it yet. You can take an orange and put it on the mantelpiece. You can keep it there and it will never decay—it will dry up. You can keep it there until it gets as hard as grain. Again, you can put it in a trunk and have it among your clothing, where the moisture is taken up by the surroundings, and it will never decay, and will finally dry up. Now, the reasonable supposition is, that if you had a dry-house with trays, with the fruit only one deep on a tray, and some heat passing over them, taking off the surplus moisture, the orange would keep to ship to any part of the world. I believe it will pay to do it. I will take an instance where I ship a carload a day. Last season being a dry season, I had no trouble, but you take another season with wet winter rains almost every day, and the orange will take up a great excess of moisture by the rain. You can take any orange, pick it immediately after a rain, pack it immediately after, and it will decay before it gets to San Francisco. You must wait till sunshine comes and dries it out to a certain extent. For that reason I think it will be necessary for the men who ship largely to have a dry-house and take off the surplus moisture, and then we can hope and expect that we may ship oranges to any part of the United States without any decay, but I must say that Dr. Congar's theory about keeping them for awhile in a house I have not found correct.

Dr. Congar: I did not say in the house. I keep them on the ground under the tree. I had Mr. Rose's experience in keeping them in the house.

Mr. Cooper: Referring to the remarks of Dr. Congar, I find it is very dangerous to give theories. In Southern Europe, and with the Spanish and French, they are about equally divided on the subject of seedlings. There are seedling lemons up in the exhibition hall, raised at my home from the seed of a Sicily lemon, and I have sold them in San Francisco side by side, at precisely the same price with the imported Sicily lemon. They are up there now and I wish you would all help yourselves and see what they are like. I have the budded Eureka lemon, and I have tried to test both of them, and I have decided that my seedling Sicily, as Dr. Congar calls it, is the better of the two.

Dr. Congar: I refer to the seedling lemon that I am acquainted with here. Now, our Eureka lemon is a seedling, and Mr. Wolfkill has a seedling that is a superior lemon. I am not speaking of that, I am speaking of the seedling lemon—great big things with the rind as thick as a citron.

Mr. Cooper: Mine I keep four months. These upstairs were picked about four months ago; picked by a Chinaman, without any particular care. I have kept them six months.

At this point a recess was taken until afternoon.

AFTERNOON SESSION.

The Chairman announced the programme of the hour: "How the Fruit Growers are to Dispose of Their Fruits Without Coming into Competition with Each Other as to Prices for the Same Quality and Kinds of Fruit."

ADDRESS OF H. P. LIVERMORE ON FRUIT SHIPPING.

Mr. President, Ladies and Gentlemen, Fruit Growers of Southern California: I esteem myself fortunate in having the privilege of speaking to you on a subject which I conceive of such very great importance, that it needs a great deal of talking about, and, I may say that, in so speaking to you, I shall give you not an address, but a business talk. I speak to you as a business man who, something like ten years ago, became interested in the fruit-growing proposition in vineyards and orchards situated in Sacramento County, where, for the last six years, until this present year, I have had not only large proprietorship, but personal management. In those six years I have had to ship to eastern markets, fruit and grapes of various kinds to the different houses. Now, in all that period of six years, I have never been able, as a proprietor of such interest, and as a manager of such business, to predicate one single element of certainty, season by season, for that interest. As a proprietor of such property, I have always felt that I was in the dark, that I was shooting at random, that I might land my game, or that I might have to respond to the drafts for deficits. This year particularly has such been the case; and when the realizing sense came upon me, that no contract can be made for the placing of California fruits in the eastern markets, that we had to gather them at random, that we had to take our chances, that we had to run the gauntlet of competition with all California producers who were similarly situated, I said to myself, this is a condition of things that cannot but be disastrous. It means nothing less than confiscation of this property interest if it continues. Naturally, holding that view, and being, as I say, a man of business experience, accustomed to the solution of business problems, I turned about to see what there was in the situation that would afford any protection in the future, or what there might be in the situation that would threaten a permanent continuation of such things, reaching, in advance, the conclusion that if such was continuously to be the condition of the fruit interest of California, I wanted to gracefully withdraw from it and pocket my loss.

I have had extensive familiarity, for all these years, with the northern fruit interests, derived from personal inspection of the produce of that section. I then considered it was necessary and proper for me to know something of your southern interests. I came south, and passed nearly two months quietly going about your various communities, feeling the pulse of the situation; and it did not take me long to find out that the condition of things which was exercising us, existed quite as seriously here as there. It did not take me long to find out that you had the same problem to solve, that I, as an owner of such property, had, namely: that the property which I thought last year was worth one hundred cents on the dollar, might be of doubtful availability this year, and under the present condition of things.

Let us not go into particulars; let us not publish unnecessarily this condition of things, but let us take counsel together, whether it must not be admitted among ourselves that our property interests, our values in such property, are seriously threatened by the present condition of the fruit trade, and would be, in a great measure, overturned by the continuance thereof. Such was my conviction. I returned to San Francisco with my mind pretty thoroughly made up that the situation was as bad as I had anticipated, and probably was beyond present remedy. I say present, for even then I could not bring myself, as a business man, to think that men of sagacity, of good judgment and of experience, such as I thought the fruit growers of California were, would long tolerate such a condition of things.

Shortly thereafter, there came an announcement of a convention of the "Fruit Growers of California," and I naturally attended that convention with no very definite idea of what would come out of it, but with the conviction that the thing to do was for the fruit growers to get together, and that the convention was a means of so doing. Being there, I found various suggestions, and, in connection with others, who, like myself, were earnestly moving and endeavoring to remedy existing evils, I was placed upon a committee to take in hand this proposition and suggest a remedy. That committee was composed of gentlemen who are doubtless familiar to you all, but I will, for purpose of a full understanding, give you their names: William H. Aiken of Santa Cruz, R. J. Trumbull of San Francisco, Abbot Kinney of Los Angeles County, A. Block of Santa Clara County, Horatio P. Livermore of San Francisco, F. C. De Long of Marin County, M. M. Estee of Napa County. That committee was instructed to inquire into the whole subject, and to propose a method for redressing the evils that oppress us. They held serious deliberations; at first without being in complete unison, latterly reaching an understanding to justify a report in the convention.

Resolved, That it is the opinion of the majority of your committee, that the fruit growers should organize a corporation confiding the management of their fruit for eastern shipment to a duly qualified Board of Directors of the said corporation, for the protection of their mutual interest and the disposal of their produce.

Resolved, That the capital stock of said corporation shall be $250,000, represented by two hundred and fifty thousand shares of $1 each, and that the fruit growers shall have the privilege of subscriptions at the rate of one share of stock for each acre of bearing orchard and vineyard of shipping grapes, the same to be an operative capital fund for mutual protection purposes.

That report was taken in hand by the convention; it was deliberated upon, discussed in all aspects, through one entire day, and then, after further discussion on the second day, was finally unanimously adopted, and the same committee was directed to take charge of the business of working up the details of coöperative union or corporation, and generally putting it into effective motion. I did not know, at the time when that committee was appointed, how much was in store for the members of it in the way of solid work, but in the six weeks that ensued from the date of the first convention to the holding of the second, I had a realizing sense of it. We, however, did what we could, in the crude condition of things. I say crude, because an interest so vast and widespread as the California fruit growers' interest, is necessarily crude until it is organized. We did what we could, however, and, returning to the convention, we reported a plan; that plan was objectionable, in many respects, to various of the localities of Northern California, because they had then conceived local ideas from local preferences. Let us not say prejudices, but preferences, and preferences, perhaps, well founded in many instances. However, after long discussion and some modifications, all the interests were harmonized, and a general agreement was reached, and it gave birth to the

California Fruit Union,

A corporation which I now represent, and to which I now call your attention. I may say, before going further, that in the incorporation of this fruit union, the capital was considered by the committee as advisable to be restricted to the acreage of orchard now existing in the State—at first the bearing orchard; afterwards they opened it to all orchards, without distinction. It was the opinion of the committee, from the best information procurable, that one hundred thousand acres would cover the entire area, and it is still their opinion. For that reason they recommend a capital of one hundred thousand shares, or $100,000. It was held by the committee that that was sufficient. It was held by the committee that in all probability not that entire amount could or would be subscribed; but, that as a maximum amount, it was sufficient to start with, or rather to place as a maximum limit. The convention thought otherwise, and in the desire to give the complete latitude, and to provide for the future increase of acreage, they, by resolution, increased the capital stock to the amount of $250,000, or two hundred and fifty thousand shares. Of course, the committee were perfectly willing to accept that amendment, inasmuch as it involves nothing as to the amount of stock that should be issued, that being limited by the acreage, and it is still the opinion of the committee that the capital, which is now spoken of as $250,000, will practically, under the operation of this scheme, fall considerably within $100,000. Now, the whole theory and motive power of this scheme has always been, and is today, "coöperation;" we make a corporation because the law defines that we must, but the idea is coöperation, a "coöperative union" of the fruit growers, which they themselves shall officer and shall control, and for their sole benefit and profit. Be there little or much profit, it is for the fruit growers, and in that sense we feel that we are justified in laying a very considerable stress.

Perhaps, in order to give you a clear understanding, I had better read to you the articles of incorporation and by-laws. [Mr. Livermore read the articles of incorporation, also the by-laws as adopted Wednesday, November 11, 1885, and as published in the "Rural Press," in the issue of November fourteenth.]

The by-laws provide for nine Trustees, but it is competent for the stockholders, when they finally adopt by-laws, to increase the Trustees to eleven, and it probably will be done, to satisfy any territory requiring additional representation, and to create a local Board whenever necessary.

You will notice that the stockholder is in all cases associated with, and identified with, producing acres. Our original plan of estimating acreage for representation, was to restrict it to orchard and to shipping grapes, but as we got into the subject we found that small fruits were very likely to call for a standing in connection with our transportation, particularly if the now probable feasibility of the cold storage car were demonstrated, and the vegetable transportation would enter very largely into the question, and that the acreage that could, should, and probably would be devoted to vegetable culture for eastern shipment, would be very large; and for the additional reason that the vegetable shipments are a matter of great help to us in early shipments, it was included, so that, as the corporation now stands, the privilege of being stockholders was given to the cultivators of small fruits and of vegetables, for eastern shipment. I have thus read what constituted the articles of incorporation and the by-laws of the California Fruit Union, as considered in the committee's report to that convention. There were, however, two or three points, not placed in the by-laws, which they gave to the convention in the form of recommendations, that have not yet been incorporated into the by-laws, and may or may not be, according to the ideas of the majority of the stockholders. I will read from the report those recommendations, so that you may then have the whole thing as it is likely to stand. [Reads recommendations of committee.]

Now, I will call your attention to the fact that, first, this is a union restricted to producers; second, that the ownership in it is proportioned by acres to the interest in the fruit produced; third, that the ownership of stock is treated as a merely nominal matter; that it is not desired to make it a profit paying stock—to make it a stock that could or would be sought for as a profitable investment, but simply giving to it an interest barely compensating the capital invested, and letting the bulk of the profit go to the parties who produce the fruit in the proportion that they shall furnish such fruit. Now, I think this corporation, put into effective practice, is "boiled down coöperation," if I know what it means. The business is done by the producers themselves, in their own behalf, and the profit divided among themselves. The theory in the management of the practical business details, when we come to them, will be that the union, in handling its business, shall receive from the parties who deal with it, or who ship fruit, the same rates of commission that are now received by commission merchants, or that are paid by producers in the various channels where they now dispose of their produce, and that the union will then proceed to handle those goods on the most economical basis possible, and whatever surplus is left after paying necessary expenses will come back to the stockholders, or to fruit producers, which is the other name for stockholders, in proportion to their shipments, less the 6 per cent interest on the stock and the 2 per cent reserve. Now, for a clear understanding of the question of fruit shipments. It is perhaps proper that I should read to you what they have been during 1885 to October first. In the reports that have been compiled the committee have embodied the entire shipments of all fruits; but I will not weary you with the details. Suffice it to say that the shipment of green deciduous fruits, classified distinctly from the citrus fruits, have been, for the year 1885 up to October first, one thousand and twenty-five carloads, almost exclusively from the north; only sixty-six carloads have gone from Los Angeles. I can now make a similar report on the citrus fruits. These reports have been made in pounds; I have reduced them to carloads: San Francisco shipped one car, Los Angeles one thousand one hundred and nineteen cars, Sacramento one car; there have been minor quantities shipped from Marysville, Stockton, and Oakland, but those are immaterial. The grand total of the shipment of oranges is one thousand one hundred and twenty-one cars. These have been distributed to the following points: Denver, seventy-two cars; Pueblo, seven cars; Omaha, sixty-two cars; Lincoln, Neb., twenty-eight cars, other points in Nebraska, two cars; Atchison, twenty-six cars; Leavenworth, eleven cars; Topeka and other cities in Kansas, fifteen cars; Council Bluffs, six cars; Des Moines, three cars; Davenport, Dubuque, and other points in Iowa, fifty-one cars; Kansas City, one hundred and twenty cars; St. Joseph, fifty-eight cars; St. Louis, sixty-eight cars; other cities of Missouri, two cars; San Antonio, Texas, twelve cars; Galveston and Houston, nine cars; Austin, Dallas, and other points in Texas, twelve cars; New Orleans, five cars; Louisville, three cars; Cincinnati, twenty-eight cars; Cleveland, Toledo, and other cities in Ohio, fifty-nine cars; Chicago, two hundred and forty-six cars; Peoria, Rock Island, and other cities in Illinois, fifteen cars; Detroit, nine cars; other cities in Michigan, three cars; Indianapolis, nineteen cars; Terre Haute, Evansville, and other cities in Indiana, fifteen cars; Milwaukee, twenty-five cars; St. Paul and Minneapolis, one hundred and fifteen cars; New York, two cars; Boston, one car; Philadelphia, one car; other Atlantic cities, one car. Now, I consider that table to be instructive to the shippers of citrus fruits, as it indicates that, except at second hands, through Chicago, the great Atlantic seaboard, with its vast consuming population, has not even been broached. It indicates that Chicago is what I have heard a fruit grower very aptly term it, "the dumping point for the fruit of California," and it frequently is that, in a financial sense. Now, too much fruit goes in that direction, and vastly too little to the markets of the eastern seaboard. Well, perhaps that has been inevitable under the existing condition of things; perhaps it has not been possible to reach the eastern seaboard; we feel, with reference to the deciduous fruits of the north, which heretofore have been shipped only by passenger trains, that it really is so, and that, until we get special fruit trains and the consequent reductions of freights which only can come by special fruit trains, those far eastern markets cannot be reached. Still it is evident, from the foregoing statement, as it is also evident from the statement of green fruit shipments, that the eastern markets have not been developed at all in proportion to the development of our capacity to produce fruit, and that if we are to go on and produce fruit with the new acreage which stands behind us, coming along to contest the markets with us, to crowd us down into a condition of absolute loss, we have a great deal to do to develop not only the markets that are partially occupied, but the markets that are comparatively unoccupied. Now, I think the great necessity of united action in an endeavor to reach and develop those markets, cannot be denied, and that it needs immediate organization of all in interest. It does not do for one locality to say, as did our neighbors on the Central Pacific in Placer County: "We have exceptional facilities; we have choice mountain fruit. It is of high repute in the East, where it has the preference. We are at a very favorable shipping point, and we can get along. We make up our local coöperative organizations and we are getting along nicely." That is what they did say, and one town made a coöperative organization, and another followed, and before the shipping season was over they had five coöperative organizations, and the competition between those local shipping organizations was just as marked, and just as capable of paying Irish dividends, as if it had been individuals, and the result is, those gentlemen have candidly said: "We must take shelter under the wings of the general State organization," and they have done it.

Now, there are considerations peculiar to every locality, and yet it seems to me, that conceding every claim that any locality may make, it will fare better in a general State Union, in the great congregation, with such a corporation as we have proposed, than if it were standing by itself, each locality by itself. I can see very clearly that, in some sense, there has been too much of the stay-at-home principle among all the fruit growers of this State, and, not to be misunderstood, I will explain to you what I mean by that. I do not think the bulk of the fruit growers of California know what has been done and what is being done all over the State, in the way of multiplying means of producing fruit. I do not think the fruit men to-day know what stands behind them in the way of certain competition from the produce of other and new localities. I don't think they appreciate what we have got to handle, so as to shape our markets. Now, to-day's market may be satisfactory to a shipper in one locality, and next year's market may be an entirely different thing, because his neighbor, who has heretofore been a non-producer, may wheel into line as a producer, and push along to the front and divide the market. It looks to me as if you have got to consider and provide against that very thing. The special matter that is to be considered here, at this meeting, is the desirability of a corporation like this, in connection with the interests of this locality, and I ask your attention to a number of points that bear upon that matter. I suppose that everybody in Southern California, interested in citrus fruits, has heard of the place called Florida, and that there is a production of fruit there of the same class as produced by you here, and, perhaps, in a measure, with identical interests. Those producers of fruits are far nearer to a market than we are of the far west, and far less burdened with difficulties of getting to a market; it is true that, in a great degree, they do not come to market at the same time that your producers do, but they are an element of competition with you, in certain seasons, and a class of difficulties that assail your interests are nearly identical with the difficulties that they have had, although their difficulties are in a very much less degree. Now, I have here a circular which sets forth a prospectus of what is called the "Florida Fruit Exchange." It is an organization that is gotten up by the citrus fruit producers in Florida, to protect themselves from the difficulties that are almost identical with those you have here. [Reading from a prospectus.] Then follows the plan of the exchange which shows that it is proposed to handle all the fruits from the State under one general business organization, having its headquarters at Jacksonville, Florida, having a Board of Directors, nine in number, and having the business details intrusted to one general manager, also located at Jacksonville.

Now, that is a brief outline of what arrangement the fruit producers and shippers of Florida have been compelled to adopt under the condition of things that is not certainly as serious as that which exists here. I may remark that they have no such difficulty with their freights, and they have really far better facilities of marketing than you Southern California producers, and I do not think it admits of any argument that what has been necessary in their case is equally necessary with you. Perhaps, I have wasted your time unnecessarily in elaborating that point, because it will be readily admitted by all of you that the necessity exists for some form of union or organization that will straighten these questions and redress your grievances. Now, I will take one step further in that same direction, as illustrating the practical operation of such an organization as that just formed in Florida. I have here the instructions that are given by the "Florida Fruit Exchange," for the regulation of shipments, showing somewhat more of the details of their proposed operation. There is much of it that you will think is mere detail, but I do think that some of the facts that are enlarged upon, as to the necessity of care and selection and uniformity of packing and scrupulous painstaking for the good repute of fruit, ought to come home to us in California. I hold that one of the first duties that should devolve upon the fruit union in California ought to be to inculcate the idea that each and every producer, of whatever variety of fruit, should work to raise the standard of repute of California fruit, either deciduous, citrus, or whatever it may be. Our reputation in the eastern markets depends upon united action in that respect; more depends upon that than you think, and fruit producers and the handlers of produce generally are not sufficiently alive to it.

Railroad Rates.

The fast transportation heretofore of green fruits has been limited to passenger trains, with a charge of $6 a car, subject to all the vicissitudes of the overland passenger and express trains, which was held not to be the best class of transportation, even were the rates thereon very much reduced. In seeking a solution of that question, the committee thought the best policy was to go immediately to headquarters, and seek an interview with President Leland Stanford, of the Southern Pacific Company, because all the elements of transportation from this locality are controlled by Mr. Stanford's corporations. We sent him an invitation to meet us. He responded by meeting us in our offices, and he answered all questions we put to him, and volunteered a great many suggestions. The one controlling idea, in all he said, and he went out of his way to elaborate that, was that fruit men could not expect any better results from their interest as long as they handled it in the unbusiness-like way that they were doing. He said: "Gentlemen, organize your business; make a business basis, so that the transportation companies can make some calculations and predicate something on it, and we then can give you what you need." He said further: "As to any increased facilities or decreased rates on passenger trains, that is out of the question. Our passenger trains are already overloaded, so that we seek rather to increase the rates and decrease the burden of business. The only way out of the difficulty is a *special fruit train*, and, when you come to consider a special fruit train, we need to have an organized body with whom we can negotiate that will assure us a load for those trains. You may think it is an easy matter for us to put on these trains, and say 'here are your cars, load them up,' but the result, if we should do that, would be we would have twice the load we could carry one day and nothing the next day, so that it is entirely out of the question. However, I will promise you that if you organize your interests, and if you present yourself to us in such a shape that you can specifically contract for a freight train of fifteen cars per day, or every other day, as the case may be, you shall have that train for $300 per car—on a fast schedule time. It shall be a train with all the improved appliances for the safe transportation of fruit; the cars shall not be fitted with the ordinary freight platform, but they shall have the Miller platform, to take the shock off the stoppages, and the train shall be run on a fast schedule time, not stopping at way stations except for coal and water. By that means, being in motion all the time, it will keep up a circulation of air that will be far better for the fruit, and you may be sure that the delivery of the fruit will be better than it can possibly be by the present system of passenger trains." And further, in response to a specific inquiry, he said he would give us the same special facility of the slow freight train, with a specific time table, which might be nearly as fast as the special fruit train at times, and at other times not so fast, at $200 a car, and that, having contracted for them, the trains were in our control. We could load them as we pleased, and that, in order to avoid any features of monopoly that might be alleged against them, if anybody else wanted *a train* they could have it too, the idea being that a "special fruit train" is a matter that would have to be arranged by contract. Further than that, he said: "We believe in the fruit interest of California as the great interest of the State, if properly organized and developed. We believe it can be developed so as to overshadow every other interest of the State, and to be proportionately freight-producing for us, and, in that view, we want to do everything we can to encourage it; we cannot encourage it as it is, because there is nothing specific that we can encourage; but, when organized and put on a business-like basis, you will find that you can have anything that business-like reason calls for. If $300 a car, on fast time, does not enable you to dispose of your fruits, does not enable you to fill the eastern markets and to feed these fifty millions that want your fruit, we shall know what to do." Now, it seems to me, therefore, that the transportation question is solved just as soon as we can get together in a coöperative organization. Now, we have nothing further to urge in that connection; we think that it might safely be left to the common sense of the fruit producers of California, whether they will avail themselves of such facilities and advantages or not, for the only thing that they are called upon to do to secure them is to

Unite in an Organization,

Which practically costs them so little. Still further, there may be said to be other considerations connected with the transportation question that may be counted on to materially increase the direct advantages in special fruit train transportation. Thus, when damage is met that is not the fault of the shipper, and does not come by the act of God or the stress of elements, it is very apparent that, in handling all such matters, we can get a great deal better satisfaction and more considerate treatment, as an organization, than we can get as individuals. I think it is apparent, too, that the stronger organization we have, the better fruit producers will fare. This may truly be said as to the power of united organization. Something has been said here as to the need of legislation for protection against insect pests. Now, suppose any one locality wants legislation, goes to the Legislature and asks it, or goes to Congress. You will go home feeling that you have been insulted all the time by the way you have been treated; but if a demand comes from the *united fruit growers of California*—not less than ten thousand in number, as they probably are now—if it is put into proper shape, legitimate shape, with the suggestion that there is an organization behind it, my impression is that you will get a very speedy and favorable response. I think that in all questions of legislation, of dealing with transportation companies, of local good government, of taxes, of assessment of your property, the time has come to say that the fruit producers of California are going to organize to protect themselves, and that they know what power lies in a united organization, and that they mean, within the bounds of reason, to avail themselves of that power, and to exercise it; I say that is a perfectly legitimate thing to do; I say that the individual fruit grower would be neglectful of his interests if he did not so do. There is a whole mass of questions lying behind those I have mentioned, which would suggest themselves to any intelligent thinker, and which would receive a favorable answer at the hands of a united organized power far better than by individual action. The question discussed this forenoon, of cheap and uniform packing, can be easily solved when all act together. Nobody need be hurt, but equal rights to all can be secured in a very little time under an organization.

Now, much has been said here as to local distinctions that procure, as to the different seasons in your particular locality for fruit shipment, as to the necessity, in short, of a *local* organization to adequately represent your interests. I am not surprised at it, but I candidly think that the propositions are not based upon solid reason; you commence to ship your oranges, as I understand it, in January, and you ship till May. If you have a local organization you have got to take care of that organization, you have got to take care of its officers for the whole year, to secure their services for those four months. In the first place, as I understand it, all propositions that have been advanced for a local organization necessarily call for a very much larger capital than you would need to contribute to a general State organization; inasmuch as you have got to create duplicate facilities and carry duplicate capital; you have got to carry substantially for the entire year, the officers and the official machinery, for the business of four months of the year, that might just as well serve you for four months, and serve the rest of the State for the other months. My business experience divides this proposition into this shape. Suppose the organization enlists the confidence of the whole State, and suppose it goes immediately to work; the first thing to engage it would be the handling of the citrus fruits, and in a couple of months, I understand, your shipments will be sufficient to load special trains, and the contemplated arrangement would give you the advantage of the southern, or northern route, as you might prefer, and, if you have an insufficiency of fruit, you can, by joining with the deciduous fruit shipments of Northern California, make up your quota of the special trains. Later in the season, when the weather is warm, you, for obvious reasons, would prefer the cooler route, and, probably, would avail yourselves of the northern route, and, later still, when the bulk of your crop is shipped, and you could not yourselves make up a train, you would be very glad to join in making up a train with the deciduous fruits of the north, so, I think, you would decidedly profit in that regard. The organization, the officers, and the business machinery of the union, after handling your business for those months, could then immediately proceed to attend to other profitable business, in other sections. From the month of May to October, and sometimes into November, they could be working on the deciduous fruit shipments of the north, and earning profits, so that the persons necessary to conduct your business, as a local, distinct shipping business, in its proper season, would really be no burden to you in those months, but would do other business than yours, and earn supporting profits. There would be two months in the year, perhaps, when there would be neither business from the south or the north, and, in my judgment, that would be far less time than is desirable, and could be usefully used in the study and development of the eastern markets.

Now, whatever you may say, however you may view the fruit marketing proposition, it eventually comes down to the consumer; you can't get your money for fruit unless somebody takes it to you. After you organize your business so that you can make up the special trains to get the fruit to the consumer on these reduced rates of freight, which we all concede will be reasonable, and justify good expectation for the future, the question is, where is the consumer? It looks to me that a very considerable amount of work has got to be done in the East, to make the consumption adequate to the supply of California fruit, for my judgment is that the fruit production in California is naturally increasing more largely than the consumption in the East, that is, if left to work itself out. Now, we have got to set to work in the East, and we have got to put men there, to work out the details of the business throughout the year, as we ship. Now, you start your cars when you think they are in good order, and you trust Providence that they may get through in good order, and find profitable sale. Some of you have had occasion to notice, when you get your account sales, that they are reported to have come in other than good order, and to feel as you would like to know, of your own knowledge, whether that was really the case or not. Well, that may have been an unfounded feeling, and, nevertheless, a proper organization, with its reliable eastern agents, should be made, to see to all those things in the East, and to enable you to know, for a certainty, that the management of the cars and the trains will be such that they can be inspected, in proper form, before arriving at the destination and being unloaded, and to know what the condition of the fruit is, and to report accordingly, and, in the meantime, all who are employed in the corporation, as such eastern agents, can be working up those eastern markets. Now, in the course of the work that I have done in connection with the California Fruit Union, as Secretary, I have been receiving a great many letters—you would be astonished to see how many—bearing upon the proposition of the development of the eastern markets, from men here, and East, who hear of this fruit producers' movement, and who are familiar with the eastern markets. They all agree that nothing less than a fully equipped and continuously working organization can do justice to the subject of marketing California fruit. You may, locally, be able to solve the question of transportation for a portion of the year, but, if you do, you will do it under far greater difficulties than you can under the management of a general State Union, and you will do it in comparative disregard of the development of eastern markets.

I think I have already alluded to the relation of your shipping, for certain months, to northern shipments, but I may repeat that your earliest summer shipments, in the judgment of those of your largest producers with whom I have conversed, would stand far better as taking part in the shipments of the "special fruit trains" by the northern route, with the early northern fruits, than they can by themselves on your southern route, and that is so important a consideration that it should not be lost sight of.

I have already suggested the comparison between the effective work to be accomplished by the general organization with that of the local organization. I will recur to that topic to say, that the work of the general organization will be continuously for eight months in the year, in shipping, and for the other four months in the development of markets, working up statistical information, and doing various other things that are of great importance to your interests, although you may consider them secondary to the actual shipping. Now, I do not think they are secondary; I think that if nothing else could be accomplished by such an organization as is proposed, than the statistical districting of this State, as to its products, knowing who the producer is, where he is, and what he produces, when it is coming into bearing, and when he will be ready to ship, and generally all such information, that that alone would this year, or the next year, be cheap to any and all producers at the cost of the subscription to this union; and back of all that is the information as to the eastern markets, and the two together would be far more than equivalent to anything you would have to pay for it. I would point out again that the whole idea and theory of this union is, that each fruit grower contributes $1 an acre for a certain class of benefits, be they more or less, and that such contribution is represented by the profit-paying stock. But, taking the worst view, and supposing that the money were given away, I do not think that any of you should hesitate one moment if you were approached by a competent, reliable man, who should offer to you just these advantages, for a fee of $1 an acre, to be absolutely paid out by you. I think you would consider it cheap.

Now, I have heard inquiry as to responsibility on the subscription of stock. The responsibility is solely this: Our law provided that the liability in subscribing to and taking stock in a corporation, shall not exceed the proportion of the amount of the capital stock that is subscribed in the corporation. A party taking $10 in stock may lose his stock, and $10 more in it as the utmost. If there be any bugbear in that, it is very slight in proportion to the interest and benefits involved. There is another feature of your situation here that I do not think is sufficiently presented as to your local interests. You probably all know that you have a large acreage in other than citrus fruits in these southern counties; that, in the next two or three years, you will be large producers of peaches, apricots, and pears, and some other varieties. The tendency, as I see here from year to year, is to increase your area of deciduous fruits. Now, it may be said that there is a large portion of those that are planted with reference to drying, but the fact still remains that it is very desirable to have the opportunity to ship them as green fruits, and it is held by those conversant with the subject, that all those fruits may go East and find a ready market under proper conditions. Here, as over the rest of the State, we have not yet begun to appreciate what may be done in the shipment of apples, or to establish any proper system of shipment. Perhaps, in some cases, under the advantages of the cold storage car, that is now being offered to shippers at the moderate rate of a quarter of a cent a pound, we may reach many markets we do not now dream of with perishable fruits, so that it is not a proper view of the case to restrict your ideas and conclusions solely to citrus fruits. I hear much, locally, as to the various districts here, with reference to the supposed preference in the quality of production of each location. My idea in reference to that is, that the whole thing comes down to one common fact, and that is the eastern market. It is not what you say, or do, or think, here. It is the eastern market, the consuming element that controls. Now, the man that produces, in any given locality, a better fruit than his neighbor, will get the benefit of it; his brand gives it a value, and it consequently stands by itself and sells upon its merit, and he gets the benefit of it. It may be well said that it is desirable for every producer of California fruit, as you saw so strongly stated in the Florida shipping directions, by every means in his power to raise the standard of California fruits as a class, so that they may go forth with the very highest possible reputation. I do not think it answers for any one community to say we can take care of ourselves. If a man produces the very best of a product, and his neighbor is sending to market an article just a little less excellent in character, it is sure to have an effect upon the price of the first, unless there is some regulation, some influence that equalizes the tendencies of competition.

I have seen, in the six weeks that I spent going around in your various localities here, a number of instances among my friends, where they found out, after the evil was too late to remedy, that their neighbors had been doing them very serious damage in competing with them without being aware of it, without intending to do it, a thing that could not happen under proper organization. Nor do I think the fact that any region is better in quality of its produce than another, justifies it in expecting to stand as well by itself, and distinct, as it can stand in a union such as is proposed. I think, of course, that such benefits may be secured by a local union; but, as I before said, at very much greater cost than a State Union. As to the status of California citrus fruits in the eastern markets, it is evident that their needs be much work done upon them, and I think the stronger organization we have to do that work the better. It is an undeniable commercial fact that, although we did carry away many good prizes at the New Orleans Exposition, the bulk of eastern consumers gave preference to the Florida oranges, if both it and the California are in the market at the same time. Very fortunately for us, they are not competing throughout the season, although they do compete to some extent. Now, I think work can usefully be done in doing away with that prejudice and upbuilding the general reputation in the East among the consumers of California oranges as such, and I think the work that should be so done would bear profitable fruit in the organization sales, and in all that relates to California fruit. We must work for the highest possible reputation that can be achieved; we must work here with the producers to induce them to make their product such as would entitle it to that repute, and to pack it in a way that would do justice to itself, and to send it to market in a way that it would arrive in such a condition that it will secure for it the first place as California fruit, and that is the work for a general organization. No local organization can do it, for the moment you submit it to a local organization, you act upon this idea: "Our market will take care of itself, and the rest of the State can take care of itself." That is what it would come to. I have heard a good deal as to the best methods and necessary expenditures for freeing our trees of the insect pests, and I am impelled to ask of what value may they be, or the usefulness of any such expenditures made in that direction, if we do not settle the other proposition of what we can do with the fruit when we raise it, and, while that subject is very important, yet the market question is of paramount importance, and should be dealt with accordingly.

Among the necessary and profitable results of such an organization as suggested, might be mentioned the development of the business in dry fruit. That is a business that may be largely developed under proper handling; for if you go on with your dried fruit shipments, without some efforts to prepare markets in advance, you will find you have overstocked the markets to such an extent that you will get little or nothing for them. Another advantage that you would find to grow out of this organization, would be the prompt handling of the question of reclamations. I am aware that certain classes of losses have been thrown entirely upon the shipper that, under proper regulations, could not have been thrown upon him, and I believe that, with a distinctive organization, with proper management, you will get benefits in that way.

There is one consideration that seems to me, in one sense, to transcend all these details, and that is the capital value of our property. It will come home to almost any of you who possess property, that when you can run your business, so that you may know that your neighbor is not practically running against you, so that you may know that profitable results may be reached through your products, you have got something on which you can stand financially. I don't think it is a bold statement, I don't think it is one that any of you will call in question, to say that such is not generally the fact to-day; I know that such is not the fact with reference to the property I am interested in. I know that absolutely it has not, under the present condition of things, a market value half what I counted it worth a year ago, and, as I said before, that is my great impelling motive in taking hold of this movement so seriously. Now, I say that the very day you have consummated a *united organization*, and the broader the better, then you settle your property values, so that, in comparison to the gains you would make in that way, the contribution that you are called upon to make to the capital of the union is ridiculously small—so ridiculously small as to be contemptible. I have said something in regard to working up information as to the markets. I do not think it is any disparagement of those who, in the eastern markets, have handled our fruits heretofore—I say that they have not been able to furnish us any information as to what those markets were or might be. It is not to be expected that they can go far out of the channels of their daily business in disposing of such fruits as come to them, and filling such orders as come to them; and the matter of the creation of new markets, of the opening up of extensions of present markets, was hardly to be expected. It is a matter that requires the investment of time and money, and that matter, in my judgment, can only be effectively accomplished by an organization that is formed—not for to-day, not for to-morrow—but to work continuously for the purpose of making a market that will last and grow for all time, and knowing that behind it is this vast area in California that is coming in and being built up on the eastern consumers. We have got to do it by working up eastern consumers; we can't do it by any easy means, we can't do it by any individual operation, and I don't think you can do it by any local action.

Now, ladies and gentlemen, Mr. President, while I would apologize to you for taking so much of your time, I really have had a very extensive subject to go over, and being conscious that I have only just touched upon a good many points, I hold myself at the disposal of any gentleman who has any special inquiry to make, to respond to it if I am able.

DISCUSSION ON FRUIT UNION.

A DELEGATE: I would like to ask one question: Suppose I have five shares and five acres, and sell my five acres, what becomes of my five shares?

MR. LIVERMORE: The proposition is, that stock should be transferred only to parties owning equivalent acres. If you sell your five acres to a man who does not own five acres of producing area, such as comes within the provision of the stock, why, he would lose his right to vote on that stock; he would not lose his property in it, but he would not have a right to come into our meetings and vote. He would have his proper interest in the stock, and draw his dividends on it, but it is distinctively intended to provide that stock shall not be voted that does not hold an interest equivalent in producing lands. A man buying the land is eligible to hold the stock.

A **Delegate**: My idea was, supposing he refused to take my five shares; supposing he refused to receive them?

Mr. Livermore: You might be in such a position as to lose $5.

Dr. Congar: I would ask the gentleman to correct the matter in regard to the shipment of oranges. Los Angeles has not shipped eleven hundred cars; Riverside must have shipped four hundred, and San Gabriel at least one hundred and seventy-five carloads.

Mr. Livermore: I will merely say in explanation, that the railroad reports have placed under the heading of Los Angeles all the shipments from this district, and do not give credit to any of the other points at all, because, I suppose they take that to be the terminal point. I think that is a proper correction.

A **Delegate**: There is another question I would like to ask: Suppose I should take five shares of stock; would I be permitted then to sell my crop, providing I thought I could do it to better advantage to some other parties at home?

Mr. Livermore: For local consumption. The idea is that so far as crops have a destination to eastern shippers, whether direct or indirect, it should be through the union, so as to protect the eastern shippers.

A **Delegate**: What would be the consequence, supposing I should sell to some local dealer in Los Angeles, for instance, and he should make a shipment outside of the organization?

Mr. Livermore: The consequence would be that he would pay twice as much freight as the special trains of the organization. You understand that the privileges of special trains are proposed to be limited to the organization. We should expect any party who should take stock with us, would do it with the idea of faithfully observing the common interest of protecting eastern shipments. It would not be to his interest to let his fruit go in the direction where it could come in conflict with our eastern shipments. If it should be sold to an outsider, it would not compete, because they can't put it on the special trains, and I think the result of this union would be to control absolutely all eastern shipments. Unquestionably, you can sell to anybody you desire to.

A **Delegate**: Would $300, according to Senator Stanford's proposition, pay the freight on a carload of fruit to New York City, or simply to Chicago?

Mr. Livermore: The rate is only to Chicago, but with proportional rate to other points, less to shorter points, and more to Atlantic ports.

Mr. Williams: Suppose we make fourteen carloads of fruit on Wednesday, and can't get the other car. What are we going to do then?

Mr. Livermore: Well, we had this question up before Governor Stanford, and we asked him if that rule was cast-iron, and whether we have got to live up to it, and pay the freight whether we filled it or not. He said: "Gentlemen, I can't, in advance, lay down the rule, but here is the fact: If you are organized, and doing business in an organized and business-like way, and find that you do not just reach the point of fifteen cars, we shan't trouble you as an organization." That is about what he said, meaning thereby that he would do the best he could, and if we would do the best we could as an organization, we should be dealt with with leniency and tolerance. I consider from that, that if we could not make up the full fifteen cars on any given day, he would take what we could make.

Mr. Williams: Another question: Suppose, in my way, I do not care to ship through the organization, and want to go to Mr. Porter. Shall I pay Messrs. Porter Brothers their 10 per cent commission, and the organization 10 per cent commission?

Mr. Livermore: Not if you are as good a business man as I take you to be. This has been about the rule in handling the eastern shipment of fruit; the producers, in their various localities, will be staying home, minding their business. They do not know what other localities are producing, but would just as likely be impressed with the idea that, what was scarce with them, was scarce everywhere, and some of these people would come out about a month before the season for shipping, and they make it their business to do what our local producers are not doing; they keep their eyes open, and their mouths shut, and when they get through they know just what are the facts with reference to the production of the whole shipping area of California. This is what I know they do, and they have done it repeatedly under my observation. They then go to a given locality, where they think the fruit is most plentiful, and they pick out the man who they think is most in the need of money, and likely to be the weakest, and get a standard price from him, and so go all around, and use that as the criterion, so that the producer is practically competing with such a condition of things all the time, and has been.

Dr. Congar: There is another point, perhaps it has slipped your mind, but I will try to bring it out; it is in regard to the competing lines of railroad. Now, fortunately or unfortunately, for Southern California, we have, according to the papers, two lines over which we may be able to ship our fruit; one is styled the Atlantic and Pacific, and the other is the Southern Pacific. Now, is it not possible that Mr. Stanford and the Atlantic people might have a falling out and it might work as it sometimes does, that the Atlantic and Pacific people should say to Mr. Stanford: "We are going to try and secure our proportion, or perhaps we are going to secure the control of this fruit." Now, if we should have been bound up in the meantime with the Southern Pacific Company how can we extricate ourselves from that contract when the other line of communication might say they will take our fruit for one half, and if we join the association where we are absolutely bound, we lose the opportunity, perhaps, of taking the advantage of these circumstances. Now, this has just come to pass. We do not know that it will work out as practically as I have suggested, but there have been intimations that point a little in that direction. While I am on my feet I wish to say this on behalf of Pasadena, Los Angeles, San Gabriel, and other points, that knowing the people out there, being myself one of the oldest settlers, I doubt very much whether, under the existing circumstances, we can get the consent of the people to go into the organization described this afternoon, although I intend to join it myself, and, I may also be induced to join others here. We have got to make this matter clear and if there are any difficulties connected with it they must be explained away.

Mr. Livermore: As to the matter of railroad competition, either present or possibly in the future, I believe that a close understanding does exist between the corporations that does away with any probability of competition. It is a well understood fact, for all that the newspapers may say, that there are binding papers signed that close that up, and even supposing the contingency that a subsequent rupture might come that would bring about a competing interest here, I do not doubt that in any contract the proviso might be made that the rates would be subject to subsequent modification from competing interests, and that is one of the things that such an organization could accomplish when a local organization could not.

Mr. Milco: Some time ago I wanted to ship a carload of goods to New York to our office there, and I applied to Mr. Gray to find out whether he would not take our goods through New Orleans and by water communication to New York for less money. I said: "You run the whole line clear through and you only own a portion of the other road that runs as far as Ogden; you may just as well give us a lower rate." He said: "No, we can't do any such thing; we would have to submit such a proposition to the Transcontinental Union and tell them all about what you desired, and every one of these companies gets a certain proportion, no matter what company secures the freight." It is immaterial whether the Atlantic and Pacific takes the oranges from Los Angeles or whether the Southern Pacific takes it. There is no danger of the Atlantic and Pacific, or any other railroad, at present, trying to run over this big railway association that exists now, because I think they have got it pretty well fixed to run it for a few years longer.

Mr. Rose: There have been several meetings of this kind, and these same questions come up from time to time. They are all questions that can be arranged hereafter. Now, if I would go to any one of you, you would say that this is a good thing; but when you come to act you are slow, so that it would seem as if it were a very bad thing. Is it a fact that we want an association in this city or county, or in this district, for any purpose? If you say yes to that, then why don't you do something to that end? Here is a fruit union in the State, which certainly can have some members, even of each locality; it certainly can do some good for any locality, because, substantially, the expenses of any one locality will be the same as for the whole State. If we organize here an association for the protection of oranges and lemons, what is it we have to do, I ask you? We have to have somebody to distribute this fruit, and not only one man, but several men. You have got to have one man in every principal city in the United States, and in order to place it there for sale, and get the lowest commission, and the best men, you have got to sell it yourself, by your own agents. If you combine with the north, with their deciduous fruits, the same people will do all the work. I ask you, for yourselves, isn't it a fact, that the same men can do all this? Then, if it is desirable, what is the risk in this thing? You say that you have twenty acres of fruit trees, and you wish to market the fruit; you have to pay $10, or $20 at the outside, and that is not likely to be called for at once. If you will come into this thing, you won't have to pay half of it. And what do you get for it? You have the right to ship with the fruit growers, and that, in itself, will more than pay you your $10 or $20. As far as what Dr. Congar says as to another railroad company that may ship cheaper, there is no compulsion to force us to take the train at all. It is only when we want a train, when it is possible for us to make up a train, that we have it. That is not individually to us, but it is to the whole State of California. If I have a train, I can have the same rate, but by having the State organization, by combining a great many shippers, we may make up the train. That is the object of the organization, and if we have the opportunity to do that we will be sensible to do so. We can go to anybody that will do our work the cheapest, and to one railroad or to the other.

So far as General Stanford is concerned, he met this committee, not as a railroad man, not as a man to make money out of this affair, but he met them as a man who had the good of the people at heart. [Applause.] He met them because he wanted to see this State flourish, and he said to them, there are millions of people that will eat your fruit if you will only present it to them in a way that they can buy it. Of course, they have their fruits, but what are they? We have a different variety of grapes on this coast; they are different from any they raise back there. Our California apricots are better than those they have, and we can place these fruits in the market there, and at reasonable prices, not at 50 cents a pound, but at such a price as we can sell them.

Now, you gentlemen are talking all the time about oranges and lemons. What do I see when I go abroad in some portions of our own county? I see fields of apricots, fields of apple trees, of prunes, of plums. What are these people to do by and by? They will want a market, and they will find that they are not having as good a market as they would like to have. If you have a local organization, can you take care of them too? As far as oranges or lemons are concerned, it is a monopoly to this extent, that you have to have water, for, substantially, you cannot raise oranges or lemons without irrigation, and we have one acre, perhaps, in a hundred, that we can irrigate in these southern counties. What are you going to do with the rest of it? People are continually coming in here and settling our plains, and making gardens, without any water, and what are they planting? Planting apricots, pears, apples, peaches, etc. And what are they going to do? That is not an easy thing to say, and if anything is done, you must do it yourself. The trouble is, people foresee too many difficulties. You say this may be wrong and that may be wrong, and you do not do anything. There may be some little things to look about, and all that sort of thing, but this fruit union is to be advantageous. By means of it we will have privileges, and can, by reason of being able to load cars, distribute our fruit nearly all over the United States, by having agents in all the cities, and there will be an opportunity to sell to the best advantage. Gentlemen, you will find the necessity of coming to this, and why don't you do it now.

Dr. Frey: I think that the most conservative fruit grower in the section of country that I come from about believes that it is time to do something, or we will have to leave fruit growing to some benevolent individual who is inclined to grow fruit for the good of the country. I don't like the worms to eat up my fruit, and I think it is just about as bad to raise fruit and give it away. I think all the difficulty there is in picking the fruit and packing the fruit can be taken care of in quick succession. We can pick the fruit and we can pack it, and we can load the cars, but we can't dispose of the fruit; neither can each locality send an agent East to make arrangements for disposing of the fruit. Therefore, I say, and I think every one must say, that it is necessary to have some strong body that can do two things—one is to dispose of the fruit, and the other is to make arrangements for the transportation. In my locality we load about five cars a week. Suppose the railroad company was to load five cars a week; they would say, we don't care about five cars a week; but if they were to load one hundred cars it would make a difference. Again, if you have agents in the East, as you ought to have, traveling about all the time, when the fruit comes to a place that is fully stocked they would send it to some place that is not overstocked, and then have a man there to see that the cars are unpacked and the boxes not all jammed to pieces. Your agent is traveling on a salary, and he is discharged when he don't do his duty. Then we are not so much at the mercy of the commission men. They all, you know, are honest men, but then it don't do any harm to watch an honest man, and if we have agents in that way traveling about and picking out some of these commission merchants that we think are partially honest, and if they don't do their duty we would say to them: "You can't handle any more California fruit," and I think they are very likely to behave well. If you should say to them: "Now, you can't have any of our fruit," they would say: "There is plenty more;" but if they knew they could get no more, they would know what to do. Therefore I say the main body would do us a great deal of good, and I think it would cost very little. But I see there are some difficulties in the way. One is, that California is a very large State. Those who have not traveled over it do not know that, but it is, and the central body in San Francisco is very far off from the northern part of the State, and very far from the southern part of the State. Now, a body sitting in San Francisco would seem very vague and distant to parties in the southern part of the State. They do not know them, and do not know whether to believe in them or not, but I think they can be got over. I don't think there is any difficulty to have subsocieties in the different localities, say Los Angeles, Stockton, and Sacramento, and further north, of the fruit growing interests. I do not believe in a President and Secretary salaried; they are all very fine for the officer, but not for the society, and in each of these places we can have a Board of Trustees who do not want anything except in some cases their traveling expenses. These men would be in direct communication with the parent society in San Francisco. If we had any communication we could make it to Sacramento instead of to San Francisco, and if we had a carload of fruit, instead of sending to San Francisco we might send to Sacramento; but at the same time, the main business that we want to do is to sell our fruit, and that is done by the parent society. I can see the good of that, and I can see that all these little details can be made right by it. I can see the difficulties, but I think they can all be obviated.

Mr. Sallee: This question of the importance of organization needs no discussion. I, in common with every fruit grower in the State of California, have thought a good deal upon the subject, and we are all a unit upon that question. We know that the time has come when an organization is imperative. It is not necessary to discuss that question any more; the great object to be obtained is the distribution and sale of the fruit in the East. That is where the money comes from; that is the great object to be attained in this organization. In order to accomplish that object, there are two other things necessary, and one is the collecting of statistics; the other is the loading, picking, and shipping the fruit. Those two things are necessary in order to accomplish the one great object of the distribution and sale of the fruit, for from the distribution and sale of our fruit we receive the benefits. It is this that is for the welfare of the fruit producer, and upon this principle generally I am a Democrat and I am in favor of States' rights. The only question is, is this practicable; has there been a practicable solution of this great problem of the distribution and sale of fruit? Now, these gentlemen come down here with less than 5 per cent of the fruit growers of Northern California subscribed to this organization, representing to us the accomplishment of that great object in the north, and this is the object that must be accomplished. Every fruit grower knows it must be accomplished; the question is, how are we to get at it? We have to go on the principle of States' rights. Where is the American citizen that would say that this Government would be a practical thing were Congress to have the supervision of every State in this vast Union? We must go upon the same principle that the Government goes; we must have States; we must do what is suggested in the paper read as by-laws, that the General Manager shall district the State into fruit-producing districts. Now, he has the cart before the horse; these districts must create the General Manager, just as the States of the Union constitute Congress; the district corporation and organizations must constitute the central organization. They have commenced at the wrong end of it, there is no mistake about that. Now, what is practicable? It is a practicable thing that in every locality there can be an organization formed. There is no man in this house who will deny that, and in many localities there have been organizations formed. I have a paper in my pocket here from up in the Sacramento Valley; so in Santa Ana Valley, and Santa Barbara and San Gabriel Valley, and there are others. Now, they represent the States, and all these can be thrown into a central corporation, and let that corporation be represented in a Congress with representatives upon the basis of the strength of this individual corporation, and that forms the central power. That central power would have little to do, for each individual corporation makes its own by-laws and manages its own local affairs. It does not look to San Francisco for anything of that kind. We, from Southern California, do not want to send to San Francisco for a man to tell us how to pack our oranges. We cannot do it, and a man from San Francisco will not have time to come down here and superintend the packing of our fruits in Southern California; neither will he have time to go to the extreme north. These things must be done by the local legislature, and it is the local legislature that must create the central power, and in that way it will get strength as a central organization. They will negotiate with the railroad for shipping facilities; they will have the management and appointment for the attainment of this central idea for which we are all working—the distribution and sale of fruit. In that way, and in that way alone, can this organization be formed. In the south we cannot make a better showing than this is from the north, where they are not able to show 5 per cent of the fruit growers have subscribed to the capital stock of the central organization, but give us two weeks' time in the individual corporation, and we can come here with 95 per cent of the fruit growers of Southern California.

Mr. Rose: I was up at San Francisco, but did not propose to go into the fruit union of any kind, State or local. I was courteously treated and asked a good many questions, and discussed matters then with them. And when it came to the matter of taking stock, there were present as many or more than here now, and all those gentlemen took stock, and they were representative men of the State, too. They have not had time as yet to ask their constituents to join them since that time. I believe it to be desirable to have the State organization where the same men can do the whole business, and could do more if there were more to be done.

Mr. Hatch: At this last meeting in San Francisco, there was an earnest, interested assembly of those who own fruit in California, who were desirous of forming an organization. And, when we found that that would be done, we decided upon one organization, by means of which the fruits of California could be distributed throughout the markets of the East and competition might be avoided; and that with two organizations this could not be done. To my mind, competition was the main point to avoid. That was the conclusion to which we were forced by the result last season, by a reduction of $200 a car. I was laughed at for saying we would send too much fruit into certain localities in the eastern markets. Now, that competition must be avoided, and the fruit be placed in the hands of one distributing house, or agency, call it what you may, to dispose of, so that no place would have too much, and that each place should have all it required. With two organizations, call it a fruit growers' union, a coöperative union, or anything else, they will come into antagonism, because there is no locality in California but which, to some extent, produces the same fruits that another locality does. In your section here, the deciduous fruits will form no small part of your production in a very short time, and oranges from the north will compete with you more than you believe, for there are many localities there where fine oranges are raised, and they may yet successfully compete with you. You may put transportation down very low, but to avoid competition is the main thing. I claim that if our fruits were put in the East at the rate of $1 a ton, or if transportation would be such as to pay us $5 a ton for the privilege of transporting it, that unless it was profusely distributed, we would have no greater success than we had this year; because there would be too much in one place and we would get nothing for it, as was the case in some instances this year.

THURSDAY'S SESSION.

The Chair announced the following committee of representatives of Southern California, to consider the matter of the California Fruit Union:

Dr. O. H. Congar, of Pasadena; Abbot Kinney, of San Gabriel; James Bettner, of Riverside; C. E. White, of Pomona; T. A. Garey, of Los Angeles.

The Chairman announced the topic for the morning: "The Best Varieties of the Different Kinds of Fruits to Meet the Wants of Consumers in the Different Seasons."

THE LEMON.

Mr. A. Scot. Chapman, of San Gabriel, read the following paper on the lemon:

In considering this subject we must begin with the defects of the cultivator, who has forced it to become known at home and abroad as large and pithy, of thick skin, and bitter rind.

Any lemon allowed to thoroughly ripen on the tree is apt to, and generally does, develop the aforesaid characteristics, and produces in the cultivator a large hole in the pocket, pithy brain, and thick skull full of bitter thoughts. We will divide our subject into heads: The care and cultivation of the tree, and the gathering and packing of the fruit for market.

The lemon being very susceptible to frost, we choose a naturally dry and moist soil, but where we can at will irrigate it, for the most important thing in plant life is water; without it plant food is unavailable. Yet, we will not irrigate too much, for fear we may wash away part of our plant food and make our soil too cold and clammy.

We must also use manure, for of what benefit is it to groom a horse and not feed him? And we will feed him right well—some twenty-five tons of barnyard manure to the acre, and on that, in the fall of the year, four barrels of lime—that to render our manure available.

We can plow our trees in the month of November, and turn under our summer weeds and other manure. We will plow in the spring of the year, and turn under our winter weeds, remembering all the time that they are our best friends, for they will make our sandy soil rich and dark; they make our adobe soil light and yellow; they make both soils more susceptible to hydroscopic moisture, and retain it. Chemically, they supply the soil from the air with carbon, and from the ground have made latent plant food potent.

The trees should also be sprayed twice a year, in June and September, with two pounds of potash to one hundred gallons of water, which solution should leave the cauldron boiling hot. This not only kills all insect life, but keeps your fruit perfectly clean. Any man who has to wash his fruit has made a failure in raising it.

The fruit should be gathered green of such size that, allowing for shrinkage, will pack from two hundred and fifty to three hundred and fifty to the box. A man gathering has his sack suspended from across his shoulders, plucks the lemon from the tree with his hands. If he drops one he is not allowed to pick it up, for that lemon is apt to rot.

He carefully places them in his sack, and, having filled the same, he places them one by one in a tray; the trays are to be placed one above another in the shade of a tree. They should be six inches deep, filled four inches deep with lemons.

There they are allowed to remain for one week, the weather permitting, before they will bear the jar of transporting them to the packing house. At the packing house the trays are to be placed one above the other about six trays high. A layer of old newspapers is placed on the topmost trays, to keep the lemons therein from drying too fast and getting dusty. At the end of another week, if the weather has not been damp, they will be ready for packing, being yielding and leathery to the touch; they will also have commenced to turn yellow. Assort them into sizes, and pack those of the same size in a box by themselves.

ORANGE GROWING.

The following essay was read by Thomas A. Garey, of Los Angeles:

In the year 1880, in my work on "Orange Culture in California," I wrote as follows: "That the culture of the citrus family of fruits is destined to become one of the leading industries of the great State of California, is no longer disputed by the intelligent, reflective mind. That it is now, and will continue to be, one of the principal incentives to immigration into this State, is an acknowledged fact, which is amply proven by the testimony of all who have taken the trouble to inform themselves on the subject." I see no reason to change my views on this subject at the present time, but am more than ever convinced that as time elapses, and more knowledge is gained by practical experience, the industry will be found to be more remunerative in the future than it has been in the past. I will here remark that in this paper I prepare to quote largely from my work on "Orange Culture in California," written in 1880, and published by Dewey & Co., of San Francisco, in 1882, changing and altering the subject-matter where necessary to conform to knowledge acquired in the interim. The combined efforts of leading and progressive horticulturists will awake men who are now engaged in the great movement to organize protective business associations to facilitate, provide for, and control the markets for our citrus fruits in the commercial centers of our country, will, in the near future, in my opinion, bring increased and highly remunerative returns for the product.

I am as firm in the belief to-day as I was five years ago that orange growing in California is yet in its infancy. That orange growing, the combination for active, practical work by actual growers and producers, will increase and the result of their labors will stimulate the planting of large areas to orange and lemon trees; hence, the practical suggestions contained in this essay may be of value to those planting new orchards. It may be a warning and may enable new beginners in the business to avoid the quicksands and sunken rocks so abundant in the paths of the orange growers—may enable him to ford the stream at a safe place. The information herein contained has cost the writer many years of time. If it proves of value to those engaged, or who may engage, in the business of orange growing, I will be well repaid for my work. Passing over the matter of selection of seed, method of planting and raising the plants, selection of a proper site for an orange nursery, transplanting to nursery rows, etc., I will first speak of the

Selection of a Proper Site

For the location of an orange orchard. The site of an orchard is the first and most important consideration. I believe, all things considered, the table or mesa lands near the mountains are the best orange lands. (There seems to be some exception to this rule.) The flavor of the fruit in the valleys or near the sea is good, but the prevailing fogs, and the exudations from the black scale united, soon cover the limbs, leaves, and fruit with a thick coat of black fungus mold, rendering it unfit for market and substantially unmerchantable.

Trees that are grown in nursery or low lands that are covered with this mold, when transplanted to more favorable localities soon become clean and bright, proving conclusively that location has much to do with clean or smutty trees, and consequently clean, bright, merchantable, or smutty, black, comparatively unmerchantable fruit.

Irrigation.

As the years roll by I am more than ever fully convinced it is the greatest folly to undertake to grow oranges successfully without irrigation. If the location is first class and the soil deep and rich, and the cultivation is thorough and complete, the trees will grow and thrive until fruit appears, without irrigation. If non-irrigation is persisted in after fruiting shall have fully commenced, the fruit will be dwarfed and unsavory. At all events an ample store of water for use in emergencies is a safe and wise provision; it is my candid opinion the full measure of success can never be attained without it. If you succeed by thorough tillage without water you will deserve to be envied, but ample irrigating facilities will be safe precautions and will operate as an insurance policy against drought.

The method of applying water to orange trees is somewhat varied. In 1880 and 1881–82 I was intensely interested in the system of underground irrigation, and believed it would be a great labor-saving, water-saving, and successful method, especially in districts where water was scarce. It has not, however, met my expectations, and the more primitive methods still almost universally prevail. Though I believe irrigation absolutely necessary, I know it is a great damage in many instances where an excess of water is put upon the ground. I know of but one disease the citrus family are subject to in this county; it is what is known as the gum disease. Excessive irrigation and slovenly cultivation are admitted to be the source of this disease. Orchards properly irrigated and cultivated are not affected with gum disease; hence you who are blessed with an abundance of water, be careful and use it judiciously and intelligently. Orchards on high, well-underdrained land, that receive irrigation only when absolutely necessary, and that are carefully cultivated after each irrigation and before the ground shall have time to bake and crack, are always found free from this disease. The term "gum disease" is after all undoubtedly a misnomer; strictly speaking it is not a disease, it is simply the result of improper treatment of the trees. To cure this so called disease, remove the tree and plant a sound tree in its place.

Soil.

The quality of the soil for an orange orchard should be a deep, rich, sandy, or gravelly loam with an admixture of clay, and a gravelly subsoil free from hardpan—at all events the hardpan should not be less than six feet from the surface, but a soil with no hardpan is preferable. Where hardpan is near the surface the trees do well for a few years, but when the roots reach this hard, impervious substratum the tree at once begins to fail, the leaves turn yellow, the ends of the branches begin to die back, the orchard is ruined.

Selection and Purchase of Trees.

The selection and purchase of trees for an orange orchard is a prime factor in the future success of the venture. The fully established and generally well known reputation and reliability of a nursery are landmarks in the journey for the selection of trees that should not be overlooked.

The thrifty condition of the trees is the first item in which caution must be exercised. If the trees are healthy they will be vigorous, and the foliage will be of a dark green color. A tree suffering from bad treatment always declares the fact by its general appearance. Trees for an orchard should be two to three years from the bud or graft (one year is preferable to five or six), with clean, smooth stem and evenly balanced head. Old dwarfed culls and scrubby trees are dear at any price. Vigorous, symmetrical trees of proper age should be selected at any cost; it will pay to pay good prices for good trees. Nurserymen who consider the wants of their customers, cannot compete with careless, irresponsible importers in the business. Mr. Wiley, of Pomona, says there is not a reliable nurseryman in the State of California, but I think he is mistaken.

Plan of an Orchard.

Our orange orchard is planted not only for ourselves, but for our posterity for many generations, hence it behooves us to use judgment in planning and laying out so great and worthy an enterprise. He who successfully plants an orchard of citrus trees leaves a grand heritage to his heirs; he is a benefactor to his race. Do not plant too close; give your trees plenty of room. My experience leads me to recommend planting budded or grafted orange trees twenty-four feet apart each way; seedlings thirty by thirty feet apart; lemons, budded varieties, twenty by twenty feet apart; limes the same. I consider these distances ample for the full development of the trees. Plant the trees in straight lines. It pays well to take time to stake an orchard so the rows will be straight. If crooked and irregular, with here and there a tree out of line, it will be extremely disagreeable to the artistic eye, besides being more difficult to cultivate.

Transplanting to Orchard.

Transplanting to orchard is generally considered simple and easy, and with few exceptions it is done in too much of a hurry. The question is not as it should be, how shall I proceed to plant my trees in the best manner to insure a quick and permanent growth, but, how can I plant my trees in the least possible time, and with the least expense. He who follows out this idea has at least ample time in which to repent at his leisure for his haste in throwing his trees in a slovenly, careless manner into the soil. It is important to know what month is best in which to transplant the trees, as to understand any other point in the business. I have planted to nursery rows and to orchards many hundreds of thousands of orange trees, having planted in every month of the year. I think I have perhaps had more practical experience in this matter than any other person in this

State at least. If extreme care and caution be used, even to the minutiæ, they can be transplanted at any time with some degree of success. I should have remarked that the orange tree is one of the hardiest trees known; they will survive very harsh and unhorticultural-like treatment, they will withstand drought and excess of water, they will live and make a stunted growth with slovenly cultivation, when what are called our hardy trees, under like treatment, would die. At the same time the whole order of the genus citrus responds most gratefully to proper treatment. I have found that May is the best month in which to transplant; there is no danger of frost, the windy season is past, the ground is warm and the weather is mild, being neither too hot nor too cold. There is usually more cloudy weather in this month in Southern California than in any other, not excepting even the rainy season. February is my next choice. When trees are to be moved long distances, for instance from the nurseries of Southern California to the northern counties of the State, I prefer the month of February, all things considered, in which to move them. Occasional hot spells occur in May in the northern counties, and for this reason, and this alone, February is preferable. June is better than March, and July is better than December or January. I have had less success in the fall than at any other time. I would rather plant in August than in October or November.

The holes for the trees should be dug from two and a half to three feet in diameter and the same in depth. Throw the surface soil to one side and the subsoil to the other, that the surface soil may be put in the bottom of the hole, where the trees shall be planted, and the subsoil above. Two methods of digging the trees are generally practiced. First, to bag the roots, and second, to puddle the roots or cover with grout after digging. The former method is the safest, but the latter, when well and properly done, is the better. Great care must be taken in handling orange trees; when planting, the roots must not be exposed to the sun or wind; the roots must not at any time from digging to planting be allowed to get dry. The orange tree being an evergreen, the fibrous or feeding roots dry up surprisingly quick, and when once dry nothing can resuscitate them to their normal condition. When planting bagged trees do not remove the bagging, but plant it with the tree; it soon rots and does no harm. I recommend cutting the limbs back severely at this time, more than at any time before or after. The condition of soil at the time of removing the trees from nursery rows is very important. It should be in good order, thoroughly damp, in a good condition suited to the rapid growth of the tree. An orange tree seldom lives if removed from the nursery when the ground is very dry. Probably more trees are lost from this cause than from any other, though it may not be generally known. In concluding this part of this subject, a few words in reference to the tap-root may be of interest. It is my opinion a tap-root cut from twelve to sixteen inches below the surface of the ground, is as good as if cut at three feet or removed entire.

I know that when the tap-root is cut at the former depth, from two to five tap-roots generally form instead of the one original root, and strike out at different angles, thereby acting as substantial braces to the trees and penetrating the earth to a great depth. But save all the lateral and fibrous roots as nearly intact as possible, and the loss of most of the tap-root will do no injury.

Cultivation.

It is of great importance to give close attention to the matter of cultivation; the soil must be kept mellow and clean at all times. The method of cultivation should be such as to leave the surface of the soil as level as possible, except in the fall at the approach of the rainy season, when the ground should be plowed with a turning plow, turning the soil to the trees; leaving the trees on a slight elevation, and causing the winter rains to be drawn from the trees to the dead furrow in the center of the spaces. The ground is comparatively cold in winter, and it is detrimental to the growth and health of the tree to allow water to stand near the trees to injure the roots.

The orange tree will not flourish in this climate when the roots stand in soil filled with water. Some implement that will pulverize the soil thoroughly and destroy the weeds should be used. Cultivate close to, and around the trunks of trees, as well as between the rows. Commence early in the spring and keep the cultivator running all summer; in the fall, as already stated, finish with a turning plow, being careful to turn a shallow furrow near the trunks of the trees, increasing the depth as you approach the center of the spaces. Deep plowing destroys the fibrous fruit-producing roots of orange trees, to the great injury of the tree and the crop. In the spring use a turning plow again, turning the soil from the tree, leaving the soil level. There is a difference of opinion among horticulturists as to the depth to which an orange orchard should be plowed; some favor shallow plowing, some deep plowing. I approve of and advise shallow plowing, not to exceed two or three inches in depth near and adjoining the trunk of the tree, and within a radius of four feet from it, increasing the depth gradually from this point to the center of the spaces, the greatest depth not to exceed six inches. The general cultivation of the season should not exceed four inches.

Crops in Orchard.

Do not, under any circumstances, plant any kind of crops in your orange orchard. If you propose to plant ten acres in orchard, and cannot make a living until the orchard commences to return an income, then plant five acres to orchard, and plant annual crops on the other five acres. This is sufficient on this point: Look around among your neighbors' orchards and note the condition of the orchards used annually for various crops, and contrast their appearance and condition with the orchards used and devoted entirely to the trees, and you will be convinced that planting any kind of a crop, either cereal or vegetable, is a great injury to the orchard.

Fertilizing.

The arable land of California is generally exceedingly rich and fertile. Two crops of ordinary products are often taken off annually for a long series of years, without fertilizing and without any apparent diminution of yield. Perhaps no country in the world responds more promptly and faithfully to the demands of the husbandman without fertilizing than the arable lands of California. Large orchards are producing abundantly without having received any artificial fertilizers. However, I believe a generous coat of well composted manure annually, will be a paying investment. Manure should never be mixed with soil when filling up the excavation at the time of setting the tree. I have tried this method to my regret. It increases the heat to an unnatural degree, which requires an unusual quantity of water to modify, and damages the tree very much; spreading the manure evenly on the surface of the ground around the tree, to a distance equal to the diameter of the top, is the proper method of applying it.

The manure should be at once mixed with the soil by cultivation. The best time to apply the manure is in the fall, at the commencement of the rainy season; then the rains and subsequent irrigations carry the liquid manure down to and among the roots of the trees, where it is appropriated for the growth of the trees.

Pruning an Orchard.

Now we have arrived at one of the most important branches of the subject of orange growing. At the last quarterly session of the Los Angeles County Pomological Society, held at the town of Pomona, it was warmly argued by the President of the Pomona local Pomological Society that pruning deciduous fruit trees was entirely unnecessary, and a great horticultural mistake. The same argument used in regard to deciduous trees is applicable to citrus fruit culture, on general principles. I think the non-pruning theory, if adopted and practiced, would soon ruin all our orchards and the reputation of our fruit, both temperate climate and semi-tropic. There is, however, much diversity of opinion prevailing in this very important branch of the science of horticulture, not as to the fact as put by some that pruning is a necessary evil and unavoidable, but in regard to the particular method to be used. Various methods are pursued, from that of allowing the trees to branch at the ground and letting them severely alone, (which might very consistently be called the Willey system), to that of pruning them up and commencing to form the top or crown at an unusual and undesirable height. The extremes of very little if any pruning, to a continuous cutting and hacking, prevails to a great degree. Perhaps so wide a difference of opinion does not exist among our fruit growers on any other branch of fruit culture. November, December, or January is the proper season for general pruning. Orange trees grow less during these months than at any other time. January is immediately prior to the season of blooming. The annual pruning should be done before the fruit forms. At all seasons of the year all superfluous sprouts on the trunk and stray branches that threaten to throw the tree out of balance should be removed without delay. A sharp knife should be used, and all cuts made as smooth as possible. All cuts made with a saw should be pared down smooth with a sharp knife. When large limbs are removed, the cut portion ought to be painted with gum shellac in proper solution to spread easily.

There are involved in pruning several principles, among which are the following: First, the removal of the branches from the trunk of the tree to admit of cultivation close to the tree with a horse and cultivator. Second, the removal of all limbs that cross or rub each other or that grow too close together diverging from one point. Third, thinning out the center of the top of the tree, cutting out all new producing branches to admit an ample supply of air and light. On the first proposition a wide difference of opinion prevails. The advocates of low pruning argue in favor of this method, because it shades the trunk of the tree from the direct rays of the sun, and that it shades the ground, preventing evaporation, and hence less irrigation. The advocates of high pruning are no less enthusiastic in defense of their theory. They argue it admits of better and more thorough cultivation close to the trunk of the tree as well as in the spaces between the trees, and at less expense. They say the entire surface of the soil should be stirred with the cultivator, not only to destroy weeds; but to pulverize the soil for the retention of moisture, and that the direct rays of the sun should fall on the whole area of the ground in the orchard. I think the soil requires the warmth of the sun, as well as cultivation, that the trees may receive the full benefit of the moisture in the ground and that the fruit may be fully developed; nearly all kinds of plants, deprived of the unobscured light of the sun, make a pale, sickly, and unnatural growth. Plenty of sunshine with an ample supply of moisture, proper and scientific pruning, and thorough cultivation, are the prime requisites to promote a quick, healthy, and vigorous growth, and to cause us to realize the full fruition of our hopes in the size, quality, and general excellence of the product. I believe in high pruning, and recommend it.

Before the trees are transplanted to orchard, and while growing in the nursery, they should be allowed plenty of limbs, which make them develop a stocky trunk. Trees trained to long, slim, branchless switches in nursery usually have poor, straggling roots. After planting to orchard, raise them gradually by removing a few of the lower limbs annually until the requisite height is attained.

I do not pretend to dictate or lay down an infallible rule as to the best of the different methods of pruning, but simply give my preferences from a practical standpoint, and their advantages as I see them, leaving the intelligent pomologist to decide for himself.

Destructive Insects and Remedies.

Now, after all the information and instructions in the preceding part of this paper is fully digested and assimilated, and the pomologist begins to feel he has a sure foundation upon which to build a business, from which he fondly hopes to derive an income to compensate him for time, money, and labor invested, he is suddenly confronted by an enemy not laid down in the programme. I refer to injurious scale. That you may know the present highly magnified and overdrawn scale bug scare is at present not new to me, at least, I will repeat what I wrote in my book on "Orange Culture," heretofore referred to, in 1880, and published in 1882. I then said: "A variety of scale bug that is new to us has made its appearance within a few years in some of our orchards, and known as the 'red scale bug.' The appearance of this insect is the advent of a real enemy to successful orange growing. As soon as it is known it has obtained a foothold in an orchard, no time should be lost in destroying it thoroughly and effectually. No half way measures will do, heroic and untiring energy must be used to destroy it and prevent it spreading over your own and adjacent orchards. The white scale, a formidable enemy to the orange tree, is somewhat prevalent at present. It appears already to have made considerable progress in our country. A year or two ago it was known only in two or three orchards, but it is now found in several places miles apart. Colonies and neighborhoods cannot be too cautious in using every possible means to prevent its introduction. I do not consider its presence fatal to the business, but it is an expensive and damaging evil that must be eradicated from our country." These warnings are as proper to-day as when written. I also said at that time, "I have sometimes thought it would be commendable and proper if the Directors of our horticultural societies would bring this subject to the attention of our legislators. There might, and ought to be, some legislation providing for the compulsory eradication of this parasite from the orchards of California."

There will always be some easy-going owners of orchards who will be slow and slovenly in their treatment of this scourge; this will, at least, have a tendency to retain it among us for a considerable time. I close my chapter on this subject with these words: "Watch your trees closely and diligently and remove every appearance of evil from your orchards—which evil is the advent of the red and the white scale bugs." I refer the further consideration of this subject to Dr. S. F. Chapin, Chief State Insect Inspector, and to our worthy County Scale Bug Commissioners, Messrs. Dobbins, Rice, and McKinley; and I ask them if I did not write in a prophetic manner in 1880, and cast a horoscope that is now being realized and understood in our State. In regard to remedies for the extermination of the red and white scale, I leave the matter with the honorable gentlemen mentioned above. In conclusion I will speak of the

Best Varieties to Plant.

Five years ago I said I would plant, if planting one thousand one hundred trees, in the following proportions: Four hundred Mediterranean Sweet; four hundred Washington Navel; one hundred and fifty Malta Blood, and one hundred and fifty thin-skinned St. Michael. I have no reason to alter or change the above proportions to any great degree at present. I would not plant seedling trees under any circumstances whatever. I would plant budded lemons only of the best, well tried varieties.

THE FIG.

The following essay was prepared by Dr. Gustav Eisen, of Fresno:

The growing and curing of Smyrna figs, or rather of so called Smyrna figs, has now for years been a desideratum for California, but so far very little has been done, and very few efforts made which have resulted successfully. If this want of success has been the result of poor varieties or of insufficient knowledge of the proper conditions of a successful culture, I leave to you to decide. We may not be far out of the way if we suspect both.

The importance of successful fig culture can hardly be overestimated for our State. In the Mediterranean countries, where the climate is very similar to our own, the fig crop is of the very greatest economical importance. Indeed, in Asia Minor and Arabia, the failure of this crop is dreaded even more than the failure of the cereals, as not only is the country at such times deprived of its chief article of export, but the failure of the fig crop means starvation for both man and beast. Such failures are, however, exceedingly rare. The figs generally known as "Smyrna figs" do not all come from Smyrna, in Asia Minor. But this port is one from which the largest portion of the fine figs are exported. While these figs are grown everywhere in Asia Minor, the very choicest are restricted to certain districts, within easy reach of the port of Smyrna. It is difficult to believe that there should be so few localities adapted to the production of the better brands of figs, and it is far more rational to think that through the ignorance and habits of the people the secrets of the successful culture of the finest figs have been confined to certain localities, and that no efforts have been made to distribute the proper knowledge to other districts. No doubt jealousy has been a powerful agency in confining the knowledge of the culture and curing of the finest figs to certain districts. To illustrate this, I will relate an incident that happened to me in Central America. The chief industry in that part of the country of which I now speak, is the making of hats from the fibers of a palm leaf. In one place there are two villages situated within three miles of each other, and the inhabitants of both do nothing else but manufacture hats. The palm leaves are not grown in the vicinity in sufficient quantity, though there is no reason why they could not be grown there. A few thrifty trees bear witness of this. The people of both villages go to Salama, one hundred miles away, to get the leaves. The idea never struck them that the leaves could be grown at their very doors. Now, in one village, Monjon, they manufacture very superior hats, which in the market bring 50 to 60 cents each. Upon arriving at the next village, Tepic, I found the men having just returned from a trip to the capital, and that they had been obliged to dispose of their hats at 6 cents apiece. Struck by the enormous discrepancy in price, I asked the natives why their neighbors got so much more for their hats, when I was told that the Monjon hats were very much better, and the Tepic people did not know how to make as good hats. In my simplicity I asked the men: "You say you have the same leaves; now why don't you learn to make as good hats?" The answer was: "Sir, we do not know how, and they do not want to tell us."

The people in these semi-civilized countries have evidently no conception of the way knowledge is distributed and exchanged in countries like our own, where, with the aid of the press and conventions, we have accomplished in a few years what has taken centuries to achieve for them.

Whence Come the Imported Figs.

But to return to Smyrna. The very best figs from there come to us from the valleys of the rivers Meander and Cayster, and from the localities known as Aidin, Nasli, Erbeyli, Sultanhissar, Demirdjik, Ademish, and Locoum. But outside of these places in the immediate vicinity of the export harbor—a location which undoubtedly is highly favorable in a country where, until lately, the crop had to be carried to the port on the backs of camels in sacks of hair—some other localities in Asia export figs of considerable merit. Such places are Aleppo, Mytilene, Tyre, Damascus, etc.

In Egypt no figs seem to be produced for export, and naturally so from the condition and character of its soil, the latter being principally bottom land, which is always more or less unsuitable to the production of a perfect fig. In Greece, especially in the Grecian archipelago, we meet with fine plantations of figs, with partly the same, partly different varieties from those grown in Asia Minor—such plantations as those of Zante and Chios and Kalamata—but the figs from here are not equal in quality to those from Smyrna; still their export from the three places amounts to ten thousand tons a year. The coast of the Adriatic produces some very choice figs, the finest coming from Catania and from Sicily; but, in fact, the whole of Italy is largely dependent upon its fig crop, and few, if any, localities are found there in which the fig tree is not grown. In Tuscany many figs are raised and the variety here called Dottati is considered superior for drying, though we believe they are principally destined for home consumption, and not for export. The south coast of the Mediterranean produces also the very choicest figs. In Algiers the fig culture is not inconsiderable, and in Morocco some of the very finest varieties are grown; according to some reports, even superior to, or at least equal to, those of Smyrna. But we have no statistics of any being exported from there. The varieties grown there are of many colors: black, white, yellow, and green, the latter being considered the finest and the most profitable.

In Spain and Portugal we find fig culture one of the prominent industries. In Sevilla and Malaga many figs are grown and many are exported. Malaga especially excels in fresh table figs, and it is from this port that we get the delicious St. Pedro and the Breba figs.

The southern part of Portugal, especially the province of Algarve, was once the chief supplier of the dried figs consumed by Northern Europe. The port of Pharo was once as famous for its export of figs as is now Smyrna, but the fig trade from these ports has of late years declined considerably. The export port of Portugal is to-day chiefly Villa Nova de Portimao, though, according to Dr. Bleasdale, even from Lisbon no inconsiderable quantities are exported. The province of Algarve is, as far as I can judge from descriptions and from my principal informant, Dr. Bleasdale, very similar to Los Angeles County. The low plains here and there traversed by low hills, slope up towards the higher mountains inland, presenting sandy slopes, cooled by the sea breezes, but untouched by the fog of the immediate coast. The southern part of France is also adapted to fig culture, but the varieties grown here are mostly different from those of the more southern States, I have just mentioned, and originated in, and more adapted to the country and climate in which they are grown. The number of varieties originated in France is simply astonishing; they can be counted by the hundred or more. As far north as Paris fig culture is practiced in the open ground, but, of course, under the greatest difficulties, caused by the inclemency of the weather and the shortness of the summer. But, notwithstanding this, says Du Breuil, the eminent French authority, we have through the origination of new varieties succeeded in producing figs not inferior to those of the southern and more favored countries. This, of course, only refers to table figs; not to those used for drying. In the south of France, especially around Marseilles, the drying and curing of figs has reached considerable importance, but the figs produced are in size and flavor decidedly inferior to the Aidin figs.

Even north of Paris fig trees are occasionally grown, but naturally more as a curiosity than for any commercial value. Even in south of England figs are grown on trellis and on walls in favorable localities.

In leaving the eastern part of the world and turning to our own, we find that figs are grown in many of the Southern States, or rather everywhere where the nature of the climate allows. The experience there has been of very much the same nature as our own in California. The fig tree grows well enough, but the varieties have been poor, in many instances worthless. In Mexico and Central America many figs are grown, both black and white, of good quality, and especially in Lower California are some plantations noted for their excellence. From a gentleman who has been living in La Paz, I learn that excellent white figs are grown there, called Brebas, and that they, what seemed to me incredible, are the second crop of a variety, the first crop of which is blue or black. These figs are said to be very delicious and highly valued. In the Central American highlands is grown a probably native variety of small, black fig, which, indeed, is very fine as fresh or candied table figs, but for drying of no value, or rather of no value as an export article in competition with white figs. In those countries I have also seen enormously large, wild fig trees, some fifteen to twenty feet in diameter at the root, and bearing very large, luscious white figs, covered with drops of juice, like white pearls, and looking exceedingly inviting and appetizing, but upon tasting them I found that no more bitter and nauseous fruit was ever tasted by man.

In California we have, as far as I know, no native fig, the Mission or California being, if not originated from seed here, probably identical with some of the many black varieties in Spain.

Soil and Climate.

The statistics of soil, climate, and other conditions necessary for a successful fig culture are so very meager and so very scattered, that the task of bringing them together is not a very thankful one, and the material thus collected is by no means sufficient in any way to satisfy us.

In considering these climatic conditions and soils, it is important to make a distinction between the cultivation of the fig for table use and for drying. The conditions for the proper culture of table figs to be eaten fresh are far less in number, and far less exacting than those for the production of a perfect and superior dried fig, destined to rival the imported article. I believe there is hardly any place in the Southern States of this continent which would not produce a fair or good table fig, provided the right variety suited to the locality is selected; but in regard to drying figs, we have to look closer to conditions of climate and soil.

What strikes us then at the offset is the great similarity of the whole interior of California with the most favored localities of the vicinity of Smyrna. The seasons are there divided into two, just as here, one dry and one wet. The winter rain commences in November and lasts until May. From May until October are the dry months, and with few exceptions no rains fall during the summer months, thus promoting the ripening of the fig and the drying of the same. Occasionally, however, heavy rains injure the ripening figs, cause them to crack and sour, and toughen the skin, and causing the otherwise white color to turn a more or less dark brown. Such seasons are by no means unknown in even the best districts in Asia Minor, and are the causes of the bad years. Thus we see that the summer rains, which here in California are so very unwelcome to almost all of our crops, are similarly injurious in the fig districts of Asia Minor. In the most favored spots of the Smyrna districts the summer heat seldom exceeds 90° and 100° F. in the shade, and 130° to 140° F. in the sun; and the freezing in winter is seldom more than half a dozen degrees. A heavier frost, however, is not considered injurious, or in any way influencing the quality of the fig crop.

The soil in Smyrna and vicinity is very variable. It contains a fair percentage of lime and potash, but is otherwise of various qualities. The most luxuriant growth is obtained in a deep rich soil, but the best figs are grown on a soil which is made loose and porous by a fair admixture of sand. A sandy loam is thus the best, probably because the drainage is here the most perfect. Such soils produce large figs, of a white, thin skin, of high flavor and great sweetness.

In aspect the Meander Valley resembles our lowest foothills—small valleys, separated by low ridges, during the dry season, as uninviting as the foothills of the Sierra Nevada or the Sierra Madre. Some of the fig orchards are planted on hill land and some in the valleys, neither locality having any decided advantage over the other. The valleys and the plains generally give thinnest skinned fruit, the skins of the mountain figs being considered thicker. But in rainy or foggy weather the mountains or hills dry up the fastest, in this respect showing a decided advantage over the low, perhaps swampy plains.

In California we will probably find many localities likely to produce the finest figs. Our experience is that the principal necessity is a well-drained soil. The nature of the soil is less important, provided that it is sufficiently sandy to be loose and porous. Almost any soil that we have can therefore be used for figs destined for drying, except one, and that is the heavy black adobe so common in many of our lower valleys. I cannot sufficiently caution against the planting of fig orchards in such soil; it is the one of all which is by nature not destined for the fig. As to which *is* the best soil for the fig, only experience can tell. A sandy, reddish or light soil is the one preferred in Smyrna; a white clayey soil is the best for the fig tree at Sidon. In Morocco and Tangier, where the choicest varieties are grown, a light loam is considered superior; indeed, there the poorest soil is preferred, but instead manure is used to increase the size of the fruit, as well as the yield.

If we then recapitulate, we find that the following conditions are advantageous to fig culture:

1. Abundance of moisture in the soil before the figs begin to ripen.
2. Good and perfect drainage at any time.
3. The gradual drying of the soil when the fruit is ripening.
4. Sufficient heat to insure sweetness in the fig.
5. Absence of any frost lower than 18° F., though the figs can stand a temperature as low as 12° F., if they are tolerably dormant.
6. Absence of heavy rains during the maturing of the fruit.

Again the following conditions are injurious to fig trees, if the object is to procure superior fruit:

1. A wet soil, with stagnant water during the fruiting season.
2. Cesspools, sewers, and ditches in so close proximity to the trees that they can send roots to them.
3. Heavy rains on the fruit when it is ripening. Some of the finest varieties are then apt to crack and sour.
4. Heavy rains and dews upon the fruit exposed for drying.
5. And last, a heavy undrainable black adobe soil, impervious to sun and air.

As to the favorable conditions I believe they are all within our reach in this State; indeed, few are the localities which cannot command them.

Planting and Cultivation.

The horticulturists of California can, I believe, have but little to learn from the mode of planting and cultivating in countries so backward in these respects as south of Europe and Asia Minor. But the very fact that in this very home of the finest figs certain operations are adopted which to us may seem highly ludicrous, or even injurious, should set us to think that we do not know it all, and at least set us to inquire as to the reasons for these peculiar practices.

First, then, in the Aidin district the fig trees are always set two in the same hole. What would we think if we saw peaches and apples planted two and two, immediately joining? After the ground has been sufficiently plowed and dug, holes are made in varying distances of twenty-five to thirty feet, according to quality of soil, the poorer soil requiring the lesser distance. In these holes the fig trees are plowed in the month of March one foot apart, and then joined at the top, and here made to cross each other like the letter X, a few inches above the ground. At the junction of the trees they are tied to each other and to a stake, so as to keep steady. From Dr. Stillman, who has visited Smyrna, I learned that both trees are allowed to grow and develop into a tree, and the stems are wound one around the other, like a trailing vine round a pole. The object of this peculiar custom is difficult to explain, as we know of nothing analogous in our horticulture. I have, however, thought the object sought is as much as possible to prevent self-fertilization, and to increase hybridization by the pollen of another tree. It may also be that the cuttings so planted are taken from the parent trees at different times of the year. This would have a tendency to produce the different crops of figs at the same time. As the first crop has more male flowers than the latter crops, it would, for the proper fertilization of the figs, be a great advantage to have them both appear in close proximity at one and the same time. The first years the figs are irrigated by some means or other, and first, when fully established, are they considered able to reach the underground moister strata. The land is plowed several times a year and highly manured. The latter is the more necessary, as small crops, such as beans and corn, are grown between the trees for several years, or until the trees reach sufficient size to shade the ground. In some orchards, however, the trees are set much further apart, or sixty-six feet every way, and the intervening space is set in olive trees or peaches. In Catania, in Sicily, the figs are set twenty-six feet apart, without other trees between, and the soil is plowed or dug twice a year. Without this annual plowing the figs are said to become small and inferior. In Nice, in France, the figs are set nineteen and one half feet or six meters apart.

The different varieties of figs attain their full bearing capacity at different ages. But in Smyrna a fig tree is considered to be in good bearing at five years after planting, or at least at that age they are considered to bear sufficiently to pay well, the yield then being one hundred and fifty pounds to the tree. From that time on the tree is considered to increase in productiveness for twenty to thirty years.

In regard to California, the distance between the fig trees should vary with the variety. For heavy growing varieties, such as the Adriatic and the San Pedro, I would think twenty-five feet would suffice; at least that is the distance I have adopted for my own trees.

In setting out fig trees it is necessary not to expose the roots to the drying winds or to sunshine. A few moments of each is sufficient to injure the roots in such way that they will require several months to recuperate.

The irrigation of the fig is a question of greatest importance. I have already shown that trees on wet or swampy soil produce inferior fruit, not fit for drying. In localities where irrigation is necessary, the supply of water must not be such that the soil is in any way made swampy, or supplied with so much water that it cannot be sufficiently drained in the fall. To give any general rule is quite impossible. There is hardly two localities in our State exactly similar in regard to the dryness of the soil, and accordingly each locality should be supplied with water differently, if at all. If we, again, regardless of locality, should consider only the fig tree proper and its growth, I would say that the tree should have just moisture enough to be kept at a healthy growth, and as such I consider one that would produce branches of from one and a half to two and a half feet each season, and rather less than more. When long, sappy roots are produced it is always an indication that there is too much water in the soil. Such wood will produce watery figs, deficient in flavor and sweetness, and flat and insipid to the taste. Such figs are neither fit for table nor for drying. It is especially during the drying season the supply of water should be limited, and I am satisfied that if the trees have had all the water necessary during the spring and early summer months, they will be much the better off by having no artificial irrigation after the first of the month of August. But this refers only to older bearing trees. Lately planted trees may require water much later in localities where irrigation is necessary. Such well matured wood is not likely to be injured by frost, even in our most severe winters.

Of no less importance to a successful fig culture is the mode of pruning.

Unlike most fruit trees, fig trees should be but sparingly pruned. Any wholesale topping and heading back is decidedly injurious, and fig trees treated thus will produce inferior fruit the following season. I cannot learn that any such heading back is practiced in Smyrna or elsewhere where fine figs are grown, and it certainly must be considered as highly favorable to the cultivator that such pruning is not necessary.

In Smyrna the trees are first raised to the height of five or six feet, then cut square off and allowed to branch out. For California I advocate to branch the fig trees very low. My plan is to sucker and pull off the sprouts the first year, but afterwards allow the tree to branch freely low down from the main stem above ground, only keeping the real root suckers away. In this way a goblet-shaped tree is produced with a solid main trunk not liable to split. The branches are sufficiently near the ground to allow the majority of the figs to be pulled by hand without the necessity to use a ladder, or without the inconvenience to climb the tree. In this way, also, the ground is kept cool and shaded, and not heated by the hot winds. The temperature of the fruit is thus kept more uniform, which, of course, is of the greatest importance. As regards after-pruning, it will only be necessary to, from year to year, cut out the dead wood and crossing and superfluous branches—to thin out, but not to cut back, except in an emergency. Such fig trees will be very different from those now generally seen. They will be trees grown for their fruit, but not for their shade.

Crops and their Treatment.

All cultivated varieties of figs have three crops of figs, more or less distinct. The first of these crops are figs which were set already in the fall of the year previous, upon shoots formed in July and August. These figs are, except in a few varieties, of no value. They are larger, as a rule, than the later crop of figs, but not equal in flavor or sweetness. The French call these figs *fig fleures*, meaning fig flowers. Through some documents kindly placed in my hands by Mr. Nelmes, of Pasadena, and also from the highly interesting work on the fig by Count Solms-Laubach, I find that in Smyrna such first-crop figs are called *Boccore*. In Italy they are called *mamme* or *fiore di fico;* in Spanish, *Breba*. It would, however, be unjust to condemn all first-crop figs. The French grow for table use certain varieties of figs which produce good first-crop figs or *fig fleures*, which are there used for table only. On such varieties the later crops are generally of indifferent quality. This first crop is generally ripe in May and June. The second crop of figs is the principal one, and in drying, the only one of any value. These figs are developed the same year as they ripen, and are found at the inner base of every leaf, while the first crop is found scattered on the branches and in places where there was a leaf the previous year. In Smyrna this crop only is used for drying figs, and is there called *Karmouse* and *Kermez*. In Italy this crop is called *profichi*. This crop begins to mature there in the end of July, but the majority ripens in the middle of August. The crop lasts generally six weeks. The third crop may be considered as the tail of the second crop, and if the weather is favorable it will keep on ripening until frost. The figs of this, the last crop, are, in Italy, called *mammoni*.

Here in Fresno I find the first Adriatic figs ripen in August, but the bulk of the crop will ripen in end of August and beginning of September, yet superior figs will keep on ripening until October is well advanced. When the figs are ripe, or sufficiently ripe to be dried and cured, they, in some varieties, drop to the ground, but in others again hang on to the tree and must be cut off. When this time arrives in Smyrna the figs are picked and put one by one, without touching each other, on matting, or even on the ground covered with cut grass or straw. The figs are on this exposed to the sun for ten to twelve days or less, according to the weather. To begin with they are turned every day, so as to be equally exposed to sun and air, and if dew is expected they are covered over with matting during the nighttime. What is needed during the drying season is not an excessive heat, but steady sunshine and dry winds. It seems to me that here in California we could satisfy the most exacting Turkish demands in this respect. When the figs are sufficiently dry, the skin feels dry, but the inside should yet be perfectly soft and pliable. The ripe and sufficiently cured figs are now picked out, and the others left to remain until ready. It will thus be seen that the figs are not dried haphazard on roofs or the ground and then dumped into boxes and shipped. This I have known to be the general practice in California, and still we wonder why our figs are not any better. When the figs in Smyrna are dried sufficiently, they are by the fig raisers assorted in three different sizes, then sacked in sacks made of camel's hair—barley sacks would, on account of the furze, not do—and then sent into Smyrna. The merchant who has furnished the fig raiser with his year's supply takes the crop out of his hands. The figs are now again assorted and are then ready to be packed.

In Portugal they have either a different variety of fig or the climate is more favorable, as the figs there dry sufficiently in five to six days. It may, however, be that some years are more favorable than others, and I am rather inclined to think this to be the cause of the shorter time assigned to the drying in Portugal. Last year I dried some Adriatic figs in five days sufficiently, but this year, which in every respect has been an unfavorable one, it needed ten to twelve days to dry the same variety.

In Portugal the figs are dried on mats made of the esparto weed—*stipa tenacissima*—which is now growing in this State. When the figs are sufficiently dried they are stored in bulk for five to six weeks, probably to undergo a sweating process, or at least to have the moisture equalized.

In France, where fig culture is carried on only under great difficulties, some proceedings are adopted to hasten the ripening of the fig, which I here will mention more as a curiosity than for any necessity in imitating them. My own experience is that none of the varieties which I have seen so far need the manipulation practiced by the French, so as to accomplish what nature, unaided, does for us:

1. Shortly before the fruit is expected to set, the terminal buds of each branch are nipped off or suppressed; this prevents further terminal growth and throws the force of the sap into the lateral leaves or fruit buds.

2. When the figs have begun setting, all the pushing, lateral leaf buds are also suppressed, except two at the base of each fruit branch. These two buds are allowed to grow, to serve as fruit-bearing branches for another year. The leaves at the base of each bud are, however, not disturbed, as they serve to draw the sap and furnish the developing figs with sufficient nourishment.

3. Less than two weeks before the expected maturity of the fig, and when the eye of the fig begins to color, a drop of pure olive oil is deposited on the eye of the fig. This operation is always performed in the evening, shortly before sunset. The next day the fig, which was green and hard, shows softening and change of color, and the maturity of the fig is henceforth advanced eight days. This process is used only for table figs, but is not considered profitable for figs destined to be dried.

In some districts again a goosequill dipped in oil is inserted in the eye of the fig. Again, in others, the eye is simply punctured with a needle dipped in oil. In speculating upon the possible effect of this dipping and oiling, it may be of interest to remember the effect the boring of the larvæ of the codlin moth has upon the apple and the pear, or the sting of insects generally upon fruit—it causes them to ripen prematurely, evidently through the greater influx of sap, in the effort of the fruit to heal the wound. The few notices we have of fig drying in France are scanty enough, our only authority being Du Breuil, and the few remarks upon this subject which I am able to make, are principally copied from him.

The figs are packed after all the dew is evaporated by the sun, placed on small trays made of reeds, and then exposed to the sun. Every evening these trays are either removed under shelter or covered over with cloths, etc., so as to exclude dew or rain. Every morning and noon again the figs are turned, in order to equally expose every side to the sun. The figs are sufficiently dried as soon as upon being flattened out toward the stalk they do not crack or break. If left later they will be too hard, and spoil. In certain localities the figs are only picked when they begin to shrivel; they are then dried in the sun for two days, and afterwards packed in sweat-boxes and let remain there for seven or eight days, and afterwards again dried in the sun. In rainy seasons the figs are dried in machine driers or evaporators, but there is some doubt of these figs being equal to sun-dried ones. In this respect different varieties of figs, no doubt, require entirely different treatment.

In packing, Smyrna excels both Portugal and Spain. We all admire the way the Smyrna figs are packed—it is the very perfection, and I believe cannot be improved upon. When the dried figs reach the packing houses, they are, as I said, again assorted by women, and then packed by men. While packing, the hands of the packers are constantly kept moist by sea water, which prevents the sugar sticking to the hands. There are two ways of packing: In the first, the figs are flattened out in such a way that the eye of the fruit is placed very nearly in the center, and the stem very nearly opposite the same. The figs are now packed in layers in boxes, in such a way that the front margin of every fig just sufficiently covers the stalk end of the fig next in front. The figs are packed in straight rows the same in the bottom, middle, and on top. To keep every row separate, and to prevent one row overlapping the other, I am satisfied that they use a small frame of iron, with partitions running longitudinally and vertically. The figs must first be packed in this frame and slightly pressed. The frame is now withdrawn from the box, and a heavy pressure is applied, which causes the surface to flatten out and become smooth.

The second way the Smyrna figs are prepared is this: Instead of being pulled or flattened out, the fig is compressed sideways until it assumes the shape of a small bag or cube or die. Upon opening a box of such figs the surface resembles a checkboard, every square being a fig. I have no doubt but that in this mode of packing an appliance is used somewhat similar to the partitions in our common egg boxes, where each egg lies in its own square department. When all the figs are in position this partition is withdrawn and the figs are slightly pressed. These square figs are never pressed as heavily as the other kind.

The size of package used for the Smyrna figs has of late gradually decreased, the largest now containing thirty and sixty pounds. But smaller packages, as being much more handy, have become more common, and five and two and a half-pound boxes are now sold most extensively. The smallest of all is undoubtedly the quarter-pound, oblong box, with one good fig on the top and with a few bad ones below, which are offered us by the railway boys. No uniform size is used, and it seems that different brands are packed in different sizes, according to the size of the figs, which always in the flattened varieties are spread out to the best advantage. The larger the fig, the more valued is the brand. The pulled and flattened figs are by the Turks called the Eleme.

But this word is not always marked on the box, two and three Crown London layers being a common brand for the better figs. Inferior brands are packed in drums, with less expense and less careful manipulation, but also with less pretentions. Of the other packing of figs, those bag or die-shaped ones, the finest brands I have seen were the Erbelli or Erbeyli and the Loucoum figs, especially the latter. Both Erbelli and Loucoum are the names of localities in the fig districts of Smyrna, and from examination of those figs I am confident they are of a different variety. They seem to me different both in shape, color, and flavor.

The Portuguese figs are inferiorly packed in so called mats made of esparto weed. The best of those figs is the *Fico da Comadre*, evidently an entirely different variety from the Smyrna figs. The next best are the *Pharo* figs, taking their name from the port of *Pharo*, from which they are exported.

Drying in California.

In drying the figs which I have exhibited here to-day, I endeavored to follow the Smyrna way as much as possible. While we evidently have yet much to learn in regard to the drying, and manipulating the figs after they are dried, I still believe that we are a good way on the right track, and it will be for you to decide if my suppositions are correct. The variety exhibited at this horticultural meeting is the Adriatic, not only the best, but the only, which I have, so far, found suitable for drying for commercial purposes.

When the figs began to wilt and to show small white seams, they were cut from the trees by means of scissors or knife, then carefully placed on trays similar to the raisin trays. I believe a further great improvement would be to nail laths across the bottom of the tray in such a way that they would form longitudinal ribs on the bottom, just the thickness of the lath, or about one-eighth inch. By placing the figs with the eye elevated on the rib the sugary contents are prevented from leaking out, which else may happen quite frequently. The figs are now placed in the sun to dry. They were turned every day to begin with by hand, but when more dry, in the same way as we turn the raisin trays. Every night the trays were covered over, and for this purpose it is best to have all the trays on one place, and not scattered around, as is the custom with raisin trays. The figs are sufficiently dried when they show the same dryness in the morning as in the evening. This is a point of great importance. If not sufficiently dried, they will afterward puff up and spoil, as if they were in a state of fermentation. In the evening the figs may seem to be sufficiently dried, but in the morning they will be found slightly swollen and puffed. They must then be dried more. It is, however, a great danger to overdry the figs. Such figs will get a cooked and earthy taste, which afterwards will never leave them, and which will injure them or spoil their value entirely. It took from five to twelve days to dry the figs, according to the weather. When dry they may be dumped in sweat-boxes for a few days, but the better way is to dip and pack right away. Now prepare a kettle or tub with boiling water, in which put enough of common unrefined rock salt, such as is used for cattle; table salt will not do. I believe the more unrefined is the salt the better. Sea water may be preferable. The latter and the rock salt contain substances which preserve the moisture of the figs and keep them pliable.

About three big handfuls of rock salt to one gallon of water is enough. When the salt is dissolved and the water is again boiling, immerse the figs for two seconds; immediately afterward thumb the figs, and work the eye of the fig downward and the stalk end upward; in fact, imitate the appearance of the imported Smyrna fig. This process is necessary. First, it distributes the thicker skin around the eye of the fig evenly, and in eating we thus get equal parts of the thicker skin and equal parts of the thinner skin. Secondly, it places the fine skin of the stalk end all on top, and when the figs are packed and pressed they present a beautiful smooth surface. I believe the dipping of the figs in boiling salt water may be dispensed with if the figs are sufficiently pliable without it. But it is absolutely indispensable to dip the figs in salt water, and during the thumbing of the figs the hands of the packer must be constantly moistened by salt water or the sugar will stick to the finger and make the operation almost impossible. After having been dipped in the brine the figs taste at first exceedingly salt, all the salt being on the surface; but after a few days the salt works into the fig and gives the fig a peculiar appetizing taste, counteracting the excessive sweetness, which else would be too predominant. I have examined the best Smyrna figs microscopically, and I find that the white floury substance, which on old figs covers their surface, is entirely due to uncrystallized grape sugar, sweated out from the fig, and to small crystals of rock salt. I believe that in Smyrna when the box is packed, and before it is pressed, the whole box is immersed in salt brine, so that the latter will fill all the pores and crevices between the figs, and thus kill any possible insect eggs and germs of fungoids or bacteria deposited on the figs, which afterwards would cause them to become wormy and spoil. In opening fig boxes I have often found the sides covered with the white incrustations of salt.

The heavy pressing of the figs, which is always so strong that it causes them to burst at the stalk end, is much objected to by the consumers, as it evidently defaces the figs. But, nevertheless, this compression is absolutely necessary. It prevents insects from entering between the figs, and it prevents the air to enter and thus dry out the figs. Observation and practice has shown me this to be the case.

As my own crop this year has not been sufficient to place the same on the wholesale market, I have not pressed them as much as they otherwise should have been pressed, and my object was to keep the figs more intact.

As guide, however, to those who now enter upon the fig culture, I will here state what I consider necessary appliances for packing figs. Thus, four things are necessary:

1. One box of wood to hold the figs.
2. An iron frame or box with bottom just large enough to slip outside of the fig box and hold it tightly.
3. An iron frame without bottom or top, to fit snugly inside the fig box. This iron frame has two or three partitions inside, also of galvanized iron, running parallel to two opposite sides of the fig box. This iron frame, with its partitions, can be roughly compared to a brick mold made for three or four bricks at a time. In packing Erbelli or Loucoum figs, this iron mold should also have cross partitions, and the whole then would resemble the partition used in our common egg boxes, only instead of holding eggs our mold would hold figs.
4. A press. The procedure of packing is now as follows: First, insert the mold just described in the wooden fig box. This box will now be

found divided by the partitions of the mold in as many chambers, but open from the top. Pack the figs in each longitudinal chamber in the way Smyrna figs are packed. When done, press lightly. Now withdraw the frame by pulling it up. Insert the fig box in the first described frame and subject it to gradually increasing pressure.

I believe a press similar to what is now used by the Fresno and Los Angeles raisin packers would be the best for this purpose. This press is worked by levers, and can keep four or more boxes under pressure as long a time as required. When sufficiently pressed, withdraw the fig box from the iron frame and nail on the cover. The figs are now ready for shipment. In case my description should not have been sufficiently clear, I may state that the iron frame, which slips outside the box, is simply to prevent the fig box bursting open, when subjected to pressure. The frame, again, which goes inside, only serves to keep the figs in rows and separate the rows. Without this it is impossible to prevent the figs overlapping, which very much detracts from their appearance.

Caprification.

I have so far not touched upon the practice indulged in in the countries round the Mediterranean, and there known as caprification. Before I enter further upon this most interesting subject, I will state as my opinion, founded upon my experience here, that, at least with the Adriatic fig, the caprification is not necessary, as this fig bears abundant and well matured crops without the same. The caprification has been practiced by the Mediterranean fig growers for two thousand years or more, or as long as any historical record can be traced back. The Roman naturalist, Pliny, who lived eighteen hundred years ago, described the same minutely, and as in his time, the same *modus operandi* is practiced to-day. After him it has been seen and described by most travelers, scientifically and otherwise. The following, in short, is the way the operation is performed: When the figs to be used for drying are of the size of a hazel nut, generally in the middle of June, wild figs of a variety called the Capri fig are gathered. Five or six of these are strung on a string, and this again is hung or thrown over the cultivated fig tree. As the tree is increasing in size from year to year, more strings with figs are hung on the tree, but more than six strings, with altogether about thirty wild or Capri figs, are never hung on the largest tree at one and the same time. The figs are hung on the trees about one hour before sunrise, when the weather is fine, and no wind blowing. If too many figs are hung on the tree, it is said the figs will either fall off or become inferior. The same operation is repeated with the second crop figs. What effect has, then, this caprification on the fruit of the cultivated figs? This is a question which has been asked repeatedly, but though some very prominent scientific observers have investigated the subject, the same is not yet to this day fully explained. Some very interesting facts are, however, known, and these are of sufficient importance to be here considered. The fig itself is something more than a seed vessel of a flower. The fleshy part is a thickened, hollow receptacle, closed, except at the very narrow opening called the eye, situated at the top of the fig. This receptacle on its inner side contains numerous minute flowers, crowded together and covering the whole of the surface of the cavity. These flowers are male and female, or staminate or pistillate. The female flowers occupy by far the largest room, and all the lower part of the cavity. The male flowers, again, the more or less narrow zone, immediately surrounding the eye of the fig. In the cultivated or edible fig the male flowers are generally wanting, or rather replaced by barren scale-like leaflets. In the different crops, the proportion between the male and female flowers is quite different. The figs of the first crop, or the *bocorre*, are those which carry the most male flowers. The second crop, or the "karmouse," carry few, and the third or last crop carry none but female flowers. As I said, except in the wild or Capri fig, the male flowers are seldom developed. In the figs grown in California, and which I have had opportunity to investigate, the male flowers were always replaced by scales; this has also been previously found to be the case in Italy, and Professor Arcangeli states that, according to his own observations, the two most generally cultivated figs around Pisa, the *Fico verdino* and the *Fico piombinese*, never have any perfect seeds developed, while the *Fico biancolino*, which is considered a semi-wild species, has, among numerous imperfect seeds, some which are easily germinated.

As an aid for those who are no botanists to distinguish between good and barren fig seeds, I will mention that if thrown in water the good ones will sink, but the barren or not fertile ones will float on top of the surface. If crushed the fertile one will be found to contain an almond-like kernel. The barren ones will again be seen to be only empty shells, but of the same size and of nearly the same color as the good seed. From a prominent botanist in San Francisco I learn, however, that both California and Australian figs occasionally have developed male flowers, but they always develop much later than the female flowers of the same fig and thus never can serve to fertilize those of the same fig, but only those of other figs. This fertilization, if it takes place, must therefore be made by the aid of insects. The part that these take in causing the maturing of certain figs was already observed by the ancients. They found that a small, yes, very minute, wasp infested the wild or Capri fig, and that when transferred to the cultivated figs they prevented the same from falling off, or at least hastened their ripening.

To understand this better we will describe the Capri fig. This fig contains no saccharine matter, is of much smaller size, and when reaching maturity it dries up and falls off. It produces three crops. The first crop, which hangs through winter and ripens in April, is called in Italy *mamme* (by the ancient Romans *cratitires*). This crop is followed in June by the second crop, or what is called the *profichi* (ancient *orni*), and lastly the September, the third crop, is called the *mammoni* (ancient *fornitis*). If we now closely examine the second crop, or the *profichi*, when fully ripe, we see here and there a black winged insect emerging from the orifice or eye at the top; its hairy body is dusted over with pollen grains from the male flowers, adhering to the hair when the insect crawled through the narrow male flower zone. And if we cut open one of those figs, we find inside a considerable number of similar insects, all striving to get out.

These insects, named already by Linnæus *Cynips psenes*, are partly winged, partly wingless. The former, or winged ones, are females, the other, wingless, males. The winged females, as soon as they leave profichi or second crop, visit the last or third crop, the mammoni, and deposit eggs in their female flowers. Similarly the winged females that develop in this crop, or mammoni, visit the yet young figs of the first crop, or the mamme, and deposit eggs in them. If now these Capri figs are hung in among the branches of the cultivated fig, the insects crawl out of the Capri figs and into the cultivated figs in mistake. Because, while the females with impunity can deposit their eggs in the Capri figs, they are ensnared into the cultivated figs by the sweet honey-like contents, and die in the attempt to reach the ovary of the flower. The eggs of the *Cynips* are not deposited loosely on the female flowers, but by the aid of the tube or ovipositor inserted between the branches of the flower stigma into the integuments of the ovule of the female flower, else the *Cynips'* eggs are said not to develop. The fertility of these Cynips is astonishing and a few of them is sufficient to pierce all the female flowers of a fig. This piercing of the flowers causes a kind of gall formation, which, while it does not prevent the development of the seed, causes the same and the whole fig receptacle to ripen prematurely. Perhaps in the same way as the wounds caused by the larvæ of the codlin moth hasten the ripening of the apple. That the caprification is practiced in Smyrna and in all the Mediterranean countries as well as in Portugal, is an established fact. The wild fig, or Capri fig, is in Portugal called *Figo do Toca* or *Chocho*. That the fig flowers cannot be fertilized but from the pollen of the male flowers from other figs is fully established; be these flowers the male flowers of the cultivated figs or those of the Capri fig.

In the very choicest Smyrna figs, however, I have found numerous fertile seeds, but also many ones empty. If these good seeds are hybridized by the pollen of the Capri fig, they certainly will not produce figs equal to those the seeds were taken from, but rather hybrids between the edible and the Capri fig. I have from the choicest *Eleme*, *Erbeyli*, and others, raised several thousand seedlings, and the future will tell me if they produce hybrid fruit or not. Some botanists have advanced to me the theory that through long cultivation the highly cultivated figs similar to the banana and the seedless grape, and the melon shrub, have become entirely barren, and both the female and male flowers lost their original functions. This, however, is contradicted through the seedlings I raised from these, the finest figs.

In regard to the advisability of importing the Cynips, or insect that fertilizes the figs, I am told by a prominent entomologist of San Francisco that numerous other insects also visit the figs, and that we here in California have several varieties of insects, which, so to say, would only be too happy to invest in our figs, provided we only are mutually accommodating to furnish them with the Capri fig.

To sum up my ideas of the caprification: I believe that the same is not practiced solely for the purpose of fertilizing the cultivated figs, or prevent them from falling off, as we have proved that we, without this process, here in California, produce as fine, and perhaps larger, crops; but also, and perhaps principally, to hasten the development of the figs, perhaps for the purpose of getting them dried and marketed before the rainy season commences. If this should be so, then the caprification should correspond with the methods used by the French—the oiling and puncturing methods described above, which we know are solely practiced to hasten the maturity of the fruit.

FORESTS AND FRUIT-GROWERS.

The following essay was read by Abbot Kinney, of Kinneloa, San Gabriel:

Forests are most important to the welfare of the human family. Their beneficial action may be regarded under three heads. First, there is the sentimental one, in which we regard the forest from its beautiful side; second, there is its productive capacity; third, its influence on climate and humidity, and therefore on agriculture and on health.

The solitude and quietness of the forest have always had their charms and delights for mankind. Its repose is tempered by the gentle movement of the rustling leaves.

The tall straight stems, and the beautiful lines of the trees, lead the mind insensibly to the contemplation of truth, and of grand things. So we find the first assembly places of men to worship God were under trees. Our own ancestors under the Druids had their religious ceremonies in groves of spreading oaks. The wood has been congenial as well to science as to religion. Plato gave the world his thought from a grove.

This was the custom generally of the Greek philosophers, and their name for a grove, "academy," has been added to our language, meaning an educational institution. Great men have almost always loved the forest, and have retired to its sheltered glades for rest and thought. Not only is this true of heroes of the past, but the leading men of our own day show the same leaning. Gladstone, in England, seeks the grove for his leisure hour, and in our own country the President has but recently returned from the Adirondack woods.

He who cares nothing for the forest, who has no love for any tree, has such a perverted nature as to be unfitted for sympathizing with human thought and action, and therefore of controlling human destinies.

There is a business side, too, in the beautiful view of the forest. The public parks are but imitations of the natural woodland glade—no city in our country from New York with its Central to San Francisco with its Golden Gate Park, but enjoys and prizes above any other public ground these miniature forests, and none but derive health and advantage through them to their people. Some of the largest parks in the country, as the Yellowstone National Park, the Yosemite Valley, etc., are mainly dependent for their attractions on the preservation of the forests in their native state. Such parks are of great value to communities, giving health and pleasure to those who avail themselves of their privileges, and attracting travelers from distant lands, who make work and business wherever they go. The protection of the Yosemite Valley in this State has brought thousands on thousands of tourists to our borders, and has added materially to the prosperity, first of those ministering directly to their wants, and through them to the whole community. Such a reservation on the second Sierra Madre Range in this county, where beautiful scenery of mountain and forest now exist would surely be of benefit in the way of advertising the locality and attracting strangers to our community, and also providing a public resort for our own people. The forest from its productive side is of still more importance.

What trade or business is there into which wood does not enter directly or indirectly? Wood is used from the farmer's plow handle to the banker's desk, from the pew and pulpit of the church to the gallows where the criminal disappears from society, from the gallant ship that sails the sea to the little skiff of the fisherman. In this country our houses, churches, and schools are largely built of wood, and always furnished with it. In fact, everything from the railroad car running on express speed to the boy's top are dependent on this material for existence. Even coal, its substitute as fuel, is only a preserved and solidified form of wood, mined by picks with wooden handles, taken up with wooden-handled shovels, run out on wooden cars, and taken to market in wooden wagons, canal boats, or other vessels.

As might be expected, when we think on all the uses of wood, the annual consumption of this material is greater than that of any other in the country, having been, according to the last census, $700,000,000.

Professor Eggleston estimates the products of forests for last year at $800,000,000. This is considerably greater than corn, our largest agricultural crop; is over double our wheat crop, and more than the combined value of the crops of hay, rye, oats, barley, buckwheat, potatoes, and tobacco. It is ten times the value of the products of all this country's mines of precious metals. The capital invested in the lumbering business alone now is over $200,000,000.

The wood used for domestic purposes, according to the census of 1880, was valued at $321,962,729.

The supply of railroad ties for one year has required the cutting of a forest area as large as the States of Rhode Island and Connecticut. As these ties require renewing about every seven years, this necessitates more than fifty-six million ties a year, or the timber growing on more than five hundred and sixty thousand acres; so, allowing thirty years for the growth of such timber, there would be required an area about the size of New Jersey, Maryland, Delaware, and Connecticut to produce this amount annually and regularly.

That is, dividing such an area into thirty parts would give the ties needed for each year on one of the parts, and when the last lot had been cut the first would again be ready.

The timber now standing in the United States will not, at the present rate of consumption, for all purposes, furnish a supply for over twenty years. I regret that this time and place will not allow me to give Professor Sargent's exhaustive figures proving this to be the fact. We should not think that California is safe from so near a wood famine. Only a few weeks ago some eastern lumbermen came from their exhausted fields and located themselves in the Sierra Nevadas, and intend to put $3,000,000 into the business. With the destruction of eastern forests such items of news will be very common, and our timber must be swept out of existence into the eastern market. The annual forest production is greater than that of anything else in this country. It seems clear that the preservation of this productive capacity is highly important.

There is no trade or industry that will not be materially and unfavorably affected by the falling off in the supply of lumber and wood, unless we except those industries that would at a greatly enhanced cost supply a substitute for it, as by making iron hoe-handles and the like. The materials of the carpenter, the pegs of the shoemaker, the wheel of the wagonmaker, the domestic fuel of the countryman, and a thousand things will become scarcer and dearer as the forests disappear. Many trades will go with the trees—the cheap and healthy wooden house we shall know no more.

To preserve some reasonable evenness between the supply and the demand of wood, the forests must be guarded against improvident working, the renewing power of the trees must be maintained, and, most of all, the gross waste and wanton destruction of the forests by animals and fire must be stopped. Those especially interested in wood and lumber products, and those dependent on this supply, should be the first to exert themselves to bring about these results, otherwise such persons as carpenters and all woodworkers will before long be without an occupation.

The lumbermen can do a great deal in this direction.

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The Canadian Government now controls the working of all government timber land, and charges a price for the privilege, usually based on the stumps of the trees cut. Waste and destruction are by law prevented, fire being guarded against by obliging the lumbermen to clear up as they cut, that is to use or make safe disposition of the branches and refuse wood. Nearly every fire in the woods burns up more or less lumber and cordwood, and thus injures those who derive their support from the forest as well as the forests themselves. Mr. Little, a practical lumberman from Montreal, speaking in the Forestry Convention, held in Boston during September, 1885, said that an experience of fifty years convinced him that the lumbermen were the most to blame for forest fires and lost more than others by them. The reason why so much was lost by fire was the way in which the lumbermen cut the wood and left the branches. He believed that it would pay the lumbermen to be more careful in their management of camp fires. In 1880, the cut of lumber was eighteen thousand million feet; last year it was twenty-eight thousand million feet, a very rapid increase. In 1880, there were marketed about one hundred and forty-six million cords of wood, and seventy-four million bushels of charcoal. This would clear in a year thirty million acres of forest, an area about the size of New York State. Hewn timber posts, telegraph poles, etc., demand much wood. Ten million acres of forest were either altogether destroyed or seriously injured in 1880 by fire. In all, there is an annual drain on the forests of over fifty millions of acres.

The waste is the most painful part of this whole business. In California one may see in the south *paisanos* cutting the limbs from oak trees to sell for fire wood, leaving the trunks as too expensive to work; in other places lumbermen use the clear timber alone, leaving the branches and small wood to rot, or endanger the remaining trees by the heat of the fires that so often occur. In another place they only take the bark for tanning purposes, leaving the whole tree, save its skin only, to go to waste. In no way does it seem possible to prevent this waste and destruction, except by government control and supervision; even if there were no waste, there ought still to be a control of the forests to preserve their recreative and productive power so fast disappearing.

This waste by man and fire has grown, until it now endangers the welfare of the laboring people of the country, of the timber interest, the greatest of the country, and perhaps endangers the productiveness of the country itself through climatic changes. It has altered from being carelessness to being a crime, and should be put an end to.

The third view of the utility of forests is one that ought to attract great and immediate attention in California, specially here in the southern part of the State.

The effect of the forests on climate, and consequently on all human activities, is well recognized. The Prussian Forestry Commission has demonstrated, by experiment under Professor Muttrich, that the temperature of trees is nearly constant, at about 54 degrees, and that the temperature and humidity of the air is positively affected by forests. Thus, woodlands have a modifying effect, similar to that of the sea, upon the air that surrounds us, preventing the extremes of heat and cold, and of dryness that would and do occur upon lands when there are no trees. Rapid alterations of temperature are the causes of strong winds, storms, heavy rains, cloudbursts, hails, etc. Forests reduce the violence and frequence of these, and distribute the rainfall more evenly and prevent the extreme and trying dryness always found at times in places from which more than the proper proportion of forest has been removed.

No one who has lived in a wooded country can have failed to notice that the roads after rains always dried fastest in the open, and that the mud remained longest in those parts of the way shaded by trees. Evaporation and rapid running off of the water is in such shaded spots less than in the bare, open fields. The roadway skirting the forest of Meudon has been often cited in this connection. The road is bordered by two drainage ditches, one on the forest side and the other next the fields. In the first ditch the water is always clear and trickles through it long after the rains cease, while on the other side a muddy rill runs only during the rain, to disappear immediately when the rain stops.

The valley of the St. Phalaz is another interesting instance from France. Here there are two valleys as nearly as possible equal in size and inclination of watershed, one bare and the other forested. In the first, heavy rains are followed by torrents which destroy the roads and wash away bridges, destructively rolling rocks and gravel into the bottom lands. After rains there is no water; everything is dry. In the forested valley no dangerous or damaging floods occur. The water remains clear, and persists after the rains cease.

MM. Jeandel, Cautgril, and Bellaud, *Gardes Generaux des Forets* addressed a memoir to the Academy of Sciences of France, in 1861, on this subject. Their observations were made in two basins of the Meurthe of similar size and inclination, but one destitute of trees and the other largely covered with them. Their extended and careful observations showed that in the bare basin it was either a flood or a drought as regards the streams, while in the forest-covered basin, rains caused less increase in the streams, while the waters of these persisted in a perennial flow. From St. Helena, Ascension, South America, and South Africa come observations corroborating those already cited, many of which I have quoted in former papers on this subject.

The Willimatic Thread Company some time since accidentally illustrated the influence of plants on the atmosphere. The nature of the operations of this company demanded a reasonable and constant humidity of the atmosphere in their shops. To obtain this they had employed two men and a spraying machine, but Colonel Barrows, desiring to increase the comfort and pleasure of his operatives, commenced the cultivation of plants around the factory and placed many in the rooms, employing one gardener to take care of them. The atmosphere was at once changed in character; the spraying machine was no longer needed, one man's wages were saved, and the operatives were surrounded by beautiful flowers and their lives made more pleasant.

Throughout Europe the view is held that from one quarter to one third the area of a country should be wooded to produce the best agricultural results. That is, leaving the flow of springs and streams aside, still the influence of forests upon the temperature and general humidity is such that denudation of trees beyond a certain point, although increasing the productive area, diminishes the total output.

With more work on a larger area, less is produced. This result, and secondarily the disappearance of springs, and the diminution of streams, consequent on the destruction of the woods, has caused every European Government except England, which is peculiarly situated, to institute forest departments, and look after and control the exploitation of wood.

One of the familiar illustrations showing the effect of trees on other vegetation is that plants under or sheltered by trees or belts of wood are less liable to frost and to losing their fruit by wind than those not so situated. What a few trees do for a small area, many do for a large one, and we read now that peaches, grapes, and other fruits that formerly flourished in Canada, Michigan, and other parts of America, have, since the general destruction of surrounding forests, ceased to bear so well as before, and in many places the trees themselves have died, and new plantations are without vigor or promise.

These results may not be wholly due to deforestation, but the greater injury now than formerly by frost through these districts indicates that a change has taken place in their climates, while at the same time a general destruction of forests has gone on.

In open plains the evaporation is very great, not only from the soil but from such vegetation as may be found there. The excessive evaporation produces cold and frost detrimental to crops and also causes a desiccation of the air which is sometimes equally destructive.

Often in Southern California when the wind blows from the bare deserts the excessive dryness blackens and kills tender vegetation just as frost does. Were the mountains as bare as the deserts, as they certainly will be if much longer unprotected, these winds will be still drier and more injurious to agriculture. This is shown by the fact that, as we approach the desert and such places where the mountains are bare or offer no barrier to these winds, vegetation is more injured than elsewhere.

In the open, also, greater heat prevails as well as cold. In passing over a sandy field, the heat is greater than it is on a grassy one and on this greater than in a shaded wood. It is on account of these variations of temperature that columns of air change place more rapidly in open than in wooded countries. This action we call storms, whirlwinds, etc. It is probable that a tornado never originated in a wood.

The mitigation of frosts by forests operates again indirectly to favor vegetation. Dr. Williams, of Vermont, made some experiments on this point in Vermont in the years 1789 to 1791, inclusive, and his figures, as published by Marsh, show that there is an average difference between the ground temperature of the forest and open fields of about eight degrees. On January 14, 1791, he found the ground in an open field frozen three feet and five inches deep, while the thermometer at six inches below the surface of the ground in the forest stood at thirty-nine degrees, or seven degrees above the freezing point. Boussingault's experiments in France show the same results, while on the other hand, the snow remained in the forest long after it had blown away or melted in the open.

This is not directly important on our California plains, but becomes so because the snowfall in the mountains, as on the Sierra at San Bernardino and San Jacinto, if it melts quickly, runs off in floods, while if the melting happens slowly, the springs fill up and the streams flow more evenly. The San Antonio and the range where the San Gabriel rises are also affected by frosts and snow. The Tulare and Fresno country is especially so affected. Thus, we see that forests affect vegetation, not only by the more even temperature and mitigation of atmospheric changes, but also by preserving the lowlands from floods and giving them springs and perennial streams.

This is a matter of the greatest importance to us in California. A large part of our agriculture depends on irrigation, and even where this is not the case, our domestic use of water requires the permanence of springs and wells. The mountains in this State receive the greater portion of the precipitation of moisture that takes place here, either as snow or rain. The rainfall at the base of Mt. Shasta is sixty or seventy inches annually, while at Sacramento it is in the twenties. At my ranch, at the base of the Sierra Madre, in the rainy season of 1883 and 1884, sixty inches of rain fell, while at Los Angeles, fifteen miles away, but thirty-eight inches were recorded.

Probably in the mountains themselves a still greater difference would have been observed. It is true that rain gauges on the same building at different heights and in the same town at different points, but with other conditions equal, vary often as much as two or three inches for a season. This has been the case in Los Angeles City.

There are several rain gauges carefully kept there, no two of which ever agree. But the fact, I believe, has been universally recognized and observed that the rainfall on mountains is greater than that on adjoining plains. The mountains then are the reservoirs of the country. It is amongst them that our supply for the dry season falls, and it is in their soils, strata, and fissures that the water must be held to flow off equally in summer, appearing in springs or in wells far from where it fell.

Whether the forests attract rain or snow is not settled. The authorities vary on the point. Draper is strongly against it, but others support the theory. In this country during the last ten years the rainfall in the Rocky Mountain region has had a marked decrease. Forests during this time, in that section from Utah and Colorado to Montana, have been largely destroyed, either for railroads, mining, and other similar purposes, or by fire. During the same decade the rainfall in those States west of and contiguous to the Mississippi River has increased, while at the same time an extensive planting of trees has taken place in the district. Dr. W. M. Goodwin, of La Crosse, and Dr. L. Sternberg, of Fort Harker, Kansas, with whom I have corresponded, say that springs have appeared where before unknown in that State, consequent upon the planting of trees. Whether the rainfall has permanently increased or not, the springs have come with the trees. Mr. C. Grayden, who has interests in the Island of Santa Cruz in the Danish West Indies, tells me that since the burning and destruction of the forests in that island, the climate and rainfall have entirely changed; everything is drier. The rain, he says, comes more violently and less frequently. During rains now, one can hear the stones and bowlders roar as they are carried down the mountain sides to cover and destroy the fertile valley lands below. Cattle at times die of thirst, and have often to be fed during considerable periods, none of which misfortunes occurred while the due proportion of forests remained.

Forests preserve the rains through their prevention of too rapid evaporation, by holding the porous upper soil in place, and creating with their leaves and decay the "humus," which, of all soils, is that which takes up and holds the moisture; and also by the conduits into the lower ground formed by their roots. Trees by these means allow the water to escape into lower strata, and finally, by the thousand impediments the forest offers, the waters are retarded and given time to sink. Water never flows to cut land on a wooded slope; this occurs only in the open. When the long mesa back of Pasadena was covered more or less with brush and native growth, water did not flow from it into the town center, nor did it ever flow into the swale extending to and across Colorado Street, near the new school. Since these lands have been burnt over and cleared, things have changed, and for the last two years, during rains, water cuts gulches, injuring orchards and lands where it never did so before.

In Europe such an iregular flow of water is called a torrent, and the records are full of their creation by reason of the destruction of forests, and of their extinction where the trees have been replanted; but this, of course, in consequence of the washing away of the soil where the trees are gone, is very expensive. In the south of France, where the Government is reclaiming the country from the desolation that has followed the ruin of the great forests Livy speaks of, they are carrying dirt up the mountains in baskets on muleback to start the little trees, and the plantations succeed very well.

When such trouble is taken and such expense incurred to plant trees, we may well conclude that it would be cheaper and better to take care of the forests in the first place. M. Blauqui, the distinguished French economist, in 1848, after visiting provinces in the mountainous parts of France, once densely populated, presented a detailed memoir of his observations to the French Academy. He says:

> The Alps of Provence present a terrible aspect. In the more equable climate of Northern France one can form no conception of those parched mountain gorges, where not even a bush can be found to shelter a bird; where, at most, the wanderer sees in summer here and there a withered lavender; where *all the springs were dried up*, and where a dead silence, hardly broken by the hum of an insect, prevails. But if a storm bursts forth masses of water suddenly shoot from the mountain heights into the shattered gulfs—wash, without irrigating; deluge, without refreshing the soil which they overflow in their swift descent, and leave it even more scarred than it was from lack of moisture.
>
> Man at last retires from the fearful desert, and I have the present season found not a living soul in districts where I remembered to have enjoyed hospitality thirty years ago.

Blauqui's account is one that could be easily duplicated. The result of hydraulic mining in this State is child's play to what I have myself witnessed as the result of forest destruction in mountains. Many villages and even districts have been deserted along the Italian, French, and Austrian Alps, on account of torrents, and many others are in imminent danger of the same fate. The Talfer torrent at Botzen has been diked up year after year, until when I saw it in 1879, the bed of the stream was already even with the roofs of the houses, and these are tall. The tower steeples of the villages of Schlanders, Kortch, and Laas are lower than the surface of the Gadribach, and so the instances multiply beyond any handling in this paper. We have, however, several cases here at our elbows of the alteration of streams by the burning of the brush on their watersheds. Mr. A. W. Canfield, Superintendent of the Mission Water Company, of Santa Barbara, informed me of the results of a fire on the watershed of that stream, as follows:

First, the green trees were replaced by bare rocks; thus, the beauty and attractiveness of the country was diminished. Second, the streams took a torrential character, by land slides and washouts carrying off soil, sand, and rocks, to deposit them again on lower grades in its course; thus, every rain filled up the water company's dam and reservoir with debris. Third, while the east fork, with its forested watersheds intact, maintained its usual flow of water, the desolated Mission Creek was so materially diminished in its summer flow as now to contain no more water than its formerly smaller tributary. Less severe fires have produced similar results in the Precipice and Kinney Cañons back of Pasadena and San Gabriel. The summer water in both was less for some years after the fires that injured the brush and trees on their watersheds than before.

Colonel Markham, Mr. S. Washburn, Dr. Rigg, and General Whittaker, of Pasadena, are all familiar with facts showing the drying up of springs and trees consequent upon the destruction of trees. I am embarrassed by the mass of facts which I have gathered on this point. Time will not permit much longer attention to this subject. I shall, therefore, only give the last two cases that have come to my notice.

The Torrens River, Mr. Brown, the Forest Commissioner of South Australia, says, has materially changed in character. Formerly water was to be found in it at all seasons; now the deep places have been filled by sand and gravel, and in places where formerly people crossed in ferries they now cross during most of the year dry shod. Dew has also disappeared from many localities where previously abundant. The great destruction of forests in Australia is due mainly to the sheepmen who kill the trees by girdling, expecting the denuded land to carry more sheep than it otherwise would.

The next instance to be given is that of the Schuylkill River at Philadelphia. Sixty years ago the engineers estimated the summer flow of this stream at five hundred million gallons per day. In 1874 the minimum flow had dwindled to two hundred and fifty million gallons per day. The diminution is attributed to the cutting down of the forest at its source. In Europe measures have been kept of the depth and flow of the principal rivers there, on some of them for as long as one hundred and fifty years. The Danube, the Elbe, Rhine, Oder, and Volga have all diminished in volume; where ships could once sail boats can now scarcely get along. Ten feet is a frequent lessening of depth in these rivers.

These facts, as has been said, have forced European governments to take protective measures in reference to their forests. It has not been a matter of choice but of necessity. It is their endeavor to maintain all waste places in forest, cutting the trees so that they will grow again, and maintaining about one third of their surface permanently in forest. Few countries have less than this amount of land unfit for agriculture but good for trees. Alsace and Lorraine, the two valued ex-provinces of France, have 38 per cent of their surface covered with forests which pays a net revenue of $3 per acre. All the forests under government management in Europe pay greater or less net revenue. That of India does so also, the last figures I have seen showing a net return of over $1,000,000 for that dependency of England. Thus the governments of Europe derive a revenue while preserving their countries from the fate that has overtaken the once cedar-covered hills of Lebanon, of Palestine—the land of milk and honey, now almost a desert, of Persia where most of our fruits originated, of Greece, and of portions of their own lands. The pathway of civilization has been strewn with the wrecks of fertile lands. Forestry holds out hopes that these results are not necessary and may be avoided.

Our own country has no national forestry system, and the systems of the sixteen States that have taken action in this matter are more or less crude and defective. The United States land laws now allow, one may almost say necessitate, the most barefaced frauds by lumbermen in search of timber. Mr. Goucher, a Special Government Agent, informed me not long ago that between five and six thousand fraudulent land entries had been found in the single timbered district about Mendocino County, the entries being made to obtain control of the timber. The Government is being robbed, the forest lands are stripped by lumbermen, destroyed by sheepmen, and burned by fire with impunity. Only an occasional arrest without punishment breaks this monotony.

This property that is being thus destroyed and wasted under a system that permits, and even invites fraud, is the people's. Such a condition of things should be brought to a prompt and permanent close.

When we consider the consequences of unwise forest destruction and recall the deserts of desolation such destruction has caused, we must be still more impressed with the necessity of a proper care of our forests in the interests of the people at large.

To this end I would suggest that the law providing penalties for burning forests be changed so that it would become an object for persons to bring to judgment guilty parties.

That the Government withdraw from market all its timber lands, cause them to be surveyed, and those found necessary for the preservation of watersheds be permanently dedicated to that purpose; and that none be sold unless over and above the proportion required according to present experience for the best agricultural results through climatic action. The whole to be managed like the forest lands of Europe; while giving a net return by products to be still maintained forever forest land, and lastly the abolition of the present protective tariff on lumber which not only operates to place this great interest in the hands of a powerful pool, but also sets a direct premium on the destruction of every acre of timber land in the country.

The wooded and brush-covered mountains of California are almost altogether worthless for agriculture, but their importance as attractors, holders and distributors of moisture, is vital.

The life of the springs and streams of this State is the life of every interest in it, and first of all the farmers and fruit growers. We fruit growers therefore should take energetic steps to secure the protection of our mountains, upon which so much depends.

ACTION BY THE CONVENTION.

Mr. H. P. Livermore stated that he desired to call the attention of the members of the convention to the dangers which might arise from the depletion of our forests, and to the necessity of their protection; that stockmen would frequently, to get rid of the brush, and in order to increase the amount of feed, start fires that would destroy the timber over a large area. Speaking of the damage from heaving floods caused by this general destruction of forest trees on the hillsides and mountains, he offered the following resolution, and asked for its adoption:

> *Resolved*, That it is the sense of the fruit growers of California, in convention assembled, that special protective legislation should be had by our State and National Legislatures looking to the protection of all existing forests and encouraging the creation of new ones, for the suppression, by severe penalties, of the devastating influences now rapidly deforesting the country.

Mr. Livermore (continuing): I have written this on the impulse of the moment, and I would only say that certainly no harm can be done by giving voice to such a sentiment from this body of representative men, and I would desire to offer with it the specific recommendations that are embodied in the essay that we have just listened to, and which seem to me eminently wise.

The resolution offered by Mr. Livermore was, on motion, adopted.

THURSDAY AFTERNOON'S SESSION.

The convention reassembled at the appointed hour. Dr. S. F. Chapin, in the chair, announced the topic for the hour the discussion of the papers read during the morning session.

Dr. Congar, referring to the essay read by Mr. Kinney on forestry, said that, in his opinion, the matters there referred to were not the only elements that influenced the climate—the amount of rainfall, etc.; that the air currents were also important factors to be considered, especially the northern currents, which he believed were the best; that he had observed when at the mouth of Cajon Pass, it would be perfectly calm, but when he reached the summit of the pass there would be a gale blowing so that it was almost impossible to get through. These were matters that had been but imperfectly understood, and which our scientists should look into. He said: Now, in my judgment, the difference in the seasons here does not so much depend on forestry as upon the zone which we are in, as located by the meteorological charts. It is between the thirty-seventh and thirty-fifth parallel of north longitude. When the northern currents prevail they are the condensing currents, for they are cooler, as a rule, and they meet the moisture-laden currents from the south. We are dependent upon these two strata of atmospheric circulation for our moisture. What did we have in 1862, before there was any trees cut away—before there was any fire in the mountains or anything of the kind to produce this disturbance, as is suggested in the paper on forestry? We had the rain here, and have not had storms like it. We had two years ago a storm which, for this region, the oldest settler claimed was almost unprecedented; and we have had no fires during the last five or six years. What I have to say is this: Are there not causes back of these little local effects that have to do with the precipitation of moisture? I believe that there are influences that we know nothing about—in other words, that these periods come in cycles; no one scarcely knows how long. They may be eleven or twenty or twenty-eight years in their recurrence, but they will bring us the periodical dry terms or periodical wet seasons. Of course, I know that if we put straw around our trees the moisture will be retained much longer, as we have all found out who are irrigating; on the principle that if you expose these surfaces to the hot sun you dry out the surface moisture, and the same effect would be likely to be produced by cutting away our trees.

Mr. Hatch: I believe it has been decided by scientific researches that the ruins of the Old World, and the depopulation of those countries where those ruins existed, have been principally, if not entirely, caused by the destruction of the trees, and in other countries, of later dates, similar things have been observed to a great extent. And I think that this convention ought to put considerable stress upon legislation in regard to the preservation of our forests, and the making of new ones in the localities where needed.

Mr. Wilcox: I have studied this question from various standpoints since I have been in this State, and especially around the Bay of San Francisco. I once met a sea captain who had studied the movements of the winds and found that they moved in a circle, and so I noticed in Nevada County in this State. Now, in the Santa Cruz Mountains we have a great deal more rain than we have in the valley, and I have noticed that the wind coming in at the Golden Gate followed up over those mountains and carried the fog with it. A year or two ago I investigated the subject of artesian wells, and found that these mountains contained strata, as Mr. Kinney has stated, that hold water. There are layers of earth that are impervious to water, and by means of these are formed what I call blind or underground streams coming from the mountains, which, no doubt, dischange into the Bay of San Francisco; and the more of them we tap the less water we get. Now, the question arises, if these Santa Cruz Mountains are denuded of their forests whether we will get the same amount of rainfall, and what effect it will have upon these streams. This is a very interesting question and one which I believe can be profitably considered.

IRRIGATING ORANGE TREES.

Mr. Smith, of Santa Ana: I would like to say one word to elicit discussion or information regarding one point in Mr. Garey's paper, that of cultivating the orange tree, and it perhaps pertains to all of our trees. During the past few weeks I have had occasion to pass by a small orange orchard in the district of Orange, and I noticed a peculiar method being pursued (that is, peculiar to our section of the country), and I inquired of the gentleman why he was pursuing this method. He told me it was a method pursued in Pasadena, and consisted in making a circus ring around the tree, introducing the water, and then mulching and not cultivating around the tree, and if more moisture was needed, to turn in more water by a little channel right along the outer line of its circumference, and let the mulch prevent evaporation. He said that when the land is new, that is, before it had been cultivated for two or three years, it was very loose and very porous, and when they irrigated the water would in a very short time sink down through the soil and be made available to the roots of the tree, but that owing to the constant stirring of the soil or from some other cause, the soil below where the cultivator strikes would become a perfect hardpan impervious to water. He showed me an illustration of it where he had irrigated some time before, where he could not work his land because of this impervious substratum, which was not there the first few years of his cultivation, and he had to wait until the water had evaporated sufficiently for him to get onto the land to cultivate it. He said that from experiments that he had made, if this land can remain without constant irrigation and cultivation, but only irrigated in the winter with the winter rains, that the land will again become mellow. I would like to have that question discussed by those who have experimented, as to whether this constant irrigation and cultivation will not produce the impervious hardpan, so that the water will not accomplish the purpose for which it is put on the ground.

Mr. Garey: You may take a piece of soil perfectly adapted to orange culture, and irrigated continuously for a long number of years, say eight or ten or more, and in many cases a hardpan is formed. It is formed, I presume, by a precipitation of sediment carried with the water, and continuously putting on this water in irrigating that carries the sediment; these heavier particles are deposited in the soil and added to from time to time, until a substratum of hardpan is formed. I remember a number of years ago, in old San Bernardino, I was passing where men were at work on their orange trees that were quite old and very fine, but they had begun to die. They tried everything they could think of to resuscitate those trees. They had poured water on them, and finally they concluded they would dig down and see what was the matter with the roots, and they dug down about six or eight inches and found a hardpan, as hard as adamant almost, that wouldn't work, and they took a pick and picked this hardpan up by pieces and threw back the soil and the trees came out all right. Now, I don't know exactly how this is formed, but I am satisfied that it is caused by continuous irrigation without proper cultivation. I know, too, that this matter of forming a circus ring, that the gentleman speaks of, around the tree and irrigating in that, is, I think usually done for convenience in irrigation, and where water is scarce. If water is not scarce, the usual method is to put two or sometimes four furrows to the row of trees and turn the water in and let it flow right down. As to this little ridge along by the trees, it is put there for two purposes; one is to hold the water and the other is to prevent the water from standing around and striking the trunks of the trees, which has a tendency to cause the gum disease, so called; but where water is scarce they make these circles for the purpose of economizing water. I think, further, they used mulching for the purpose of supplying the want of cultivation to a certain extent, because if you irrigate your orchard with these circles and rings it costs a good deal of money to make those basins from six to ten feet in diameter, and probably the ridge a foot or eighteen inches high around them. This has to be pulled up with a hoe and takes a great deal of labor. If you cultivate, of course you break these rims and the work has to be done over again. That you cannot afford to do, and hence resort to mulching. Now, mulching is very good in its way, but there is a very serious objection to it. There is no better harbor or hotbed in this world to raise gophers than there is in these very places. You commence and make your basins in the spring and put on a foot of straw and leave it there until the fall, and I think, as a rule, you will find any amount of gopher work during the summer. Nothing is done to break up their holes and they accumulate there and breed, and it is a danger.

MR. SMITH: Mr. Garey has not quite answered my question. From what I know of this gentleman's procedure he has given his grounds very thorough cultivation—that is, to the depth of three or four inches, and he claims that the more cultivation the harder this pan becomes. Now, I would like to ask how to make thorough cultivation and still obviate the forming of this almost impenetrable layer?

MR. GAREY: I will answer it in this way. I think it is unprecedented that cultivation will form a hardpan; in fact, I am inclined to doubt that cultivation under any circumstances causes a hardpan, except in this way. It is possible, and I think probable, that there are implements that are now and have been used to cultivate the ground that have teeth of a character to enter the surface from two to four inches, with a kind of scraping character, that do not seem to dig up and loosen the ground but very little, except just on the top, and they scrape the ground underneath. This is done very many times in the summer in Southern California in cultivating an orchard, and it is possible that that process, continually cultivating just the surface for two or three inches, and this scraping process, may pack the ground, it being wet and soft, until after awhile it amounts to hardpan.

HOW TO PREVENT HARDPAN.

DR. LOTSPEITCH, of Orange: You may cultivate ground two inches deep one season and it will form a hardpan. You may cultivate four inches deep and it will form a hardpan. You will cultivate four inches deep and irrigate it, and whenever you cultivate it down to that depth it forms, in six months' cultivation, about two inches of a hardpan. That is what it will form. Why? Because you can't go down every time a little deeper and a little deeper; if you did you would be plowing up China directly. But we commence and we cultivate four inches deep for a whole season, irrigating by the best possible means, and the rains come again and there is a hardpan. The remedy for that is to plow a little deeper than you have cultivated, in the fall of the year when the rains come, and you have no hardpan to begin next season with. But the constant process of irrigating and cultivating just a certain depth for a series of years would produce a hardpan that would be impervious, and therefore the trees would have to die in a short time; but if you will cultivate it two inches deep, three inches deep, or four inches deep for six months, and in the fall of the year when the first rains come, plow that hardpan up and let it lie, you commence upon the primitive condition of the soil, and every man that cultivates and makes a success in orange culture will have to do that.

MR. HATCH: That is very similar to what I would have said had I spoken first; but I would add to it that it is not confined to lands that are irrigated that this condition exists, but in all lands in our State. Now, it is immaterial what causes this hardpan. The fact is it exists, and that condition of things must be removed to make our lands valuable to us in the production of anything, whether it be grain or fruit.

MR. WILCOX: In relation to this matter, I have, after considerable cultivation, found a hardpan formed underneath. This was adobe soil, east side of the Bay of San Francisco. I have irrigated since then and I do not find any difference between irrigated and unirrigated lands in this respect.

Mr. Loop, of Pomona: In connection with this subject of irrigation I will give you an item of my experience. I have an orange orchard on gravelly loam that I planted eleven years ago. After about the second or third year I found there was a hardpan formed underneath, just at the bottom of our cultivation, and I found it necessary to use a subsoil plow after the rains set in and break that up, and unless I do that every other year I find there is a hardpan formed, and, unless it is broken up, it seriously affects the roots of the trees.

VARIETIES OF FRUIT.

Discussion then turned upon the best varieties of the different kinds of fruits to meet the wants of consumers in the different seasons.

Dr. Lotspeitch: I am not a deciduous fruit cultivator. My opinion, from practical experience, is that the best orange is the Rio. My reasons are these: The Rio ripens and hangs on the tree as well as any other orange we can get. It is a thin-skinned orange; it is a full-meated orange; it is sweet and juicy. Then again, it makes a fine standard tree. The fruit is not any better than the Mediterranean Sweet—not a particle; but the tree of the latter is not as good as the Rio tree. Therefore, I say, to have a fine, nice tree you can plant the Rio and have equally as fine fruit. I find in the eastern markets they can't tell the difference between the Mediterranean Sweet and the Rio, but they will say the Mediterranean Sweet, because the name has a great deal to do with it; often the name sells it. Again, the Rio is just as prolific as the Mediterranean Sweet, and the fruit hangs on the tree just as tenaciously. The Navel is a finer looking orange. It will sell for a better price in the market when it gets there, but when you commence to count up the number of boxes of the two I have first mentioned, in March and April, and compare it with the number of boxes you can get off the Navel tree in March or April, May or June, and you will find the predominance is in favor of the Mediterranean or the Rio orange. Still, the Navel will sell for more than either of the others in the market, from the fact of its lusciousness and its large size, but still it does not have a sufficient amount on the tree in the shipping season to justify us in raising it. I and my brother have thirteen varieties on our place. We have made a success in shipping our oranges East. It only requires care and attention to put your fruit in the eastern market at a profit. Two years ago we sold our oranges at $2 25 net on the tree; year before last we got $3 on the tree, and this year $1 18 on the tree; that is net, and we shipped them East and disposed of them ourselves, and we found, as I say to this audience, that the Rio has the preference of all our trees that we have planted out.

Mr. Garey: I am very much gratified to hear the doctor speak upon this subject in the manner that he does. I have the honor of being the individual that introduced the Mediterranean Sweet, and I am glad to hear it spoken of so highly. As I said in my essay, if I were planting an orchard, I would divide it and put part of it into Mediterranean Sweet and part of it in Washington Navel, for the reason that the latter is an early orange, and the Mediterranean Sweet is a late orange, so you would have double the time to market your fruit. I would like to know where the Rio can be obtained.

Dr. Lotspeitch: I am not a nurseryman, and I am unable to answer the question. As to planting varieties, so as to have them ripen at different times, I say we don't want to market fruit at all till the last of March, and a Mediterranean or Rio will stick on the tree until the first of July, and much better than the Navel. We can put them into the market for three months, and I think that is long enough for any man to market his fruit. I never plant a Washington Navel, from the very fact that you have to market that fruit early or you would realize nothing from it, as was proven last winter in shipping fruit early to the eastern market. We did not realize any profits from it.

Dr. Chubb: I believe that the fruit business is a growing industry, and we are all interested to know just now, in this part of the State, what trees to plant; not what special varieties of orange or apple, but in planting out new ground shall we plant oranges at all, or peaches, or shall we plant apricots, or prunes, or olives, or figs? And in this connection, I would like very much to have the discussion for a few minutes take the shape of giving us information from the northern part of the State, as to what they consider the future profitable branch of deciduous fruit culture. Very many of our people are partially disgusted with the orange business, on account of the difficulties attending it, and are looking to prunes, or olives, or figs, in some localities, and we would like to know how to advise newcomers in the southern part of the State, who are inclined to plant out these varieties of deciduous fruits, with a view to future marketable crops.

Mr. Hatch: We of the north have been considering somewhat the varieties that we believe the most profitable for propagation in the future, and from evidences coming to us from the sale of different products in the eastern markets, have arrived at the conclusion that fine varieties of table grapes can hardly be produced in too large quantities. There is nothing probably so much desired, and in other lines than that, we find that probably we have enough pears for the present; and we have probably raisins enough for the present. By the time those that are now planted come into bearing they will supply the demands of our people; but we think that olives, in land that is adapted to them, the nuts of California, in land that is adapted to them, and the fig are promising. It is a very opportune time in the history of California to consider that in the past we have had no fig that we could be proud of to submit to the markets of the East. I see here to-day a box of figs, which I consider indicates the possibility of an addition to the fruit industry of California, which will prove immense in its proportions. When planted in the proper place, properly cared for, packed and delivered to the eastern fruit-eating public, I believe will be a large revenue from California figs.

Mr. W. H. Aiken: The question that has been asked is very important, and, indeed from the northern part of the State we also ask that question. Every one of us probably has been more or less troubled to know just what to plant. Generally the question can be answered by saying: Plant what you can raise best in your locality. If our people would first find out what the soil that they are living on is best adapted to, what the climate where they are living is best adapted to, they could then plant what would do best, and, in that way, would make the most money. That takes some time to learn. A newcomer going into a certain locality should make a great effort to ascertain from his neighbors, who are living in the same locality, what does succeed best and what will sell for the most money. Since this eastern shipping question has come up, it can be answered further, that we had better plant shipping fruits and shipping grapes, for the reason that most any table grape may be dried, although it may not make a good raisin; so with the fruits. When the question is asked what will ship East profitably and safely, it must be a large, firm, well developed, well appearing fruit. You can take the peach, for instance, when it is raised at an elevation upon some of our low mountains or foothills. In our section, the Santa Cruz Mountains, which are about fifteen hundred feet above the sea, we can raise a peach that will go to Liverpool and arrive in good condition, as we have demonstrated repeatedly, while probably the same variety of peach grown ten miles away would not do any more than reach Chicago; and possibly would not go one hundred miles and arrive in San Francisco in good condition. So I would say, you must raise that which is adapted to your soil and your climate. I asked a gentleman from Chicago the other evening how much grapes and other fruit the City of Chicago and State of Illinois would take, if we could place it there as low even as 5 cents a pound. He said he did not think that the State now produced enough fruit to supply that city and State alone. I believe in that statement and that we can place fruits and grapes in Chicago at 5 cents a pound and clear to the producer one half of that amount. Fruits grown in the dry air and mild climate of California will stand a long shipment to the East, while fruits raised in Oregon, and any place where the rains are frequent and heavy, will not ship. We will never find a competitor in Oregon or Texas, or many other States, because of this fact.

Our apricots were considered by us utterly worthless, and little attention was paid to them until Judge Blackwood, of Haywards, had a little orchard that proved a bonanza for him, and from that little starter he said he believed he had ruined the State, by demonstrating that there was great profit in apricots, for everybody went to planting them north, south, east, and west. Then followed the French prune, a very valuable fruit, but I believe there are only a very few places in the State adapted to the French prune. It needs a very rich soil, with climatic conditions likely to cause a successful growth of the tree. I repeat the general proposition, to first ascertain what your particular locality is best adapted to and stick to that one thing. Do not have a large number of varieties of fruit, for one may do well, and another not; but have large blocks of available fruit, so that if this shipping interest succeeds, the fruit will ship successfully and bring eastern money here for it.

MR. SALLEE: We are happy to say to the emigrant who is coming to this country now, that it is no longer an experiment, as it was with the fruit growers who came here ten or twelve years ago, as to where you shall plant certain varieties of trees, and as to what kinds will be the best for shipping. The prospect is that we can plant shipping fruits and depend upon shipping them with advantage and success, that we can tell the newcomer to plant in the rich damp soils of the lowlands, the pear, the apple, and the quince, and upon the higher, drier, rich alluvial soils, the peach, the pear, the prune, and the apricot. The orange we can say to them to plant upon the rich deep alluvial soils from the Sierra Madre Mountains; the granite and the limestone, supplied with abundance of water to irrigate with. We are happy to say to the people of the north that we appreciate fully the importance of the deciduous fruit culture, and we know and appreciate where our advantage is in raising them, and we do see the advantages in this class of fruit in shipping them to the East, and though we can give many of these points to the newcomer, an experienced horticulturist who has been here ten or twelve years will give you all the advice you want.

A DELEGATE: When I started on my place I had a range of a few acres in extent, and wanted to know what to plant, and the answer was as Mr. Aiken has given—plant that which does best in your neighborhood, in your variety of soil. Well, I could not find out what did best, and, although I knew that it was unwise in a certain point of view to put a small place into a half a dozen different varieties, still I felt compelled to do it, even if I had to take out five of the varieties in the future. I thought that I would make some sacrifice to find a solution of this question, but I have not found a solution from this fact: I put in certain portions to apricots, pears, Muscat grapes, walnuts, and a few apples, peaches, olives, and figs. The result is that this last season, only two years last spring from the setting out of the trees and vines, I had a phenomenal yield, both as to quantity and quality, of apricots. The walnut trees are not large enough nor old enough to bear, but the sample taken of the walnuts from the four-year old trees from the Santa Ana table exhibit, were grown adjoining my place, and my trees give the promise of doing equally well. The pears were all Bartlett bears, excepting a few Winter Nelis, and were equal in quantity and quality to anything I ever saw or heard of for their age. The Muscat vines yielded the raisins you see on the table, and there were eight tons to the acre. Now, I don't know what is the best variety of fruit to plant, because I don't know which is going to bring in the most money. That is why we wish the question answered by the people of the north, so that we in the southern part of the State can know what, according to their experience, is most likely in the future to bring us the greatest returns, provided we can raise all these different things equally well.

Mr. Aiken requested that Mr. Smith, of Vacaville, give the convention his experience and ideas as to what to plant.

W. W. Smith, of Vacaville: Mr. President, Ladies and Gentlemen: I would tell you plainly if I could, what kind of fruit to plant to make the most money out of, for that is the question now before the people of this State. It is the all-absorbing question north, south, east, and west. We have made more money out of our cherries than any other fruit. That won't do you much good, for several have told me here that you can't raise cherries, in some parts, at least, of this section of the State. Next, we make more money out of what we call shipping grapes—the Muscat of Alexandria, the Flaming Tokay, the Rose of Peru, the Chasselas, and one or two other varieties. Any of the light colored grapes that are firm and ship well, are good fruit to ship to an eastern market to make money out of. Next, we ship a good many apricots East. The largest part of the crop of apricots of Solano County are shipped to the Eastern States this year. We have but few pears yet that have shipped well. We shipped a great many peaches this year to the eastern market. A large proportion of my peach crop was shipped to Chicago. Parties came to my orchard and bought them. The varieties of peach that ship best are the Early Crawford, Foster, Orange Cling, known with us as the Sacramento River Orange Cling, and Solway. Any good sized, yellow fleshed peach is in demand in the eastern market. The yellow freestone peach is more sought for than any other kind; however, a good, yellow clingstone peach sells well. It is not for me to tell you here what kind of soil to plant these kinds of fruit on. That has already been stated plainly by several gentlemen. If I were going to start a new orchard anywhere in the vicinity of San Francisco, I would hunt a location where the apple does well, and plant largely of winter apples. My humble judgment is, there is more money in a good apple orchard to-day, within one hundred and fifty or two hundred miles of San Francisco, than any other fruit you can plant. But the orchard must be in a locality where the apple does well.

I spent the months of August and September in the Eastern States investigating this fruit matter, as I intended to ship my own fruit on my own responsibility, and my conviction is that we shall have enough growing, when our fruit trees come into bearing, to supply the eastern markets with deciduous fruits, and citrus fruits also. If Congress would impose an import duty of about 2½ cents a pound on raisins, the raisin business would be one of the best businesses in this State, and I would get a suitable piece of land for raising raisins, and go into that business. But as it is, we cannot make money by raising raisins in California in competition with the cheap labor of Europe. It is out of the question. They can hire help at 20 or 25 cents a day, and we have to pay from $1 to $1 75. That is too high to pay labor to raise raisins or prunes, either, but were there this import duty on raisins, and say 50 cents a box on prunes, it would make either a profitable crop.

You may say I have not yet answered our question, what fruit we shall plant to make the most money from? If I knew how to answer that question, I would certainly answer it for myself, and go home and go to planting that fruit, and so would every one of you. The nearest I can come to it is to plant the fruit that grows best in your locality. You will be very likely to find a market for it if you take pains to raise choice fruit. Do not let your trees overbear; thin them thoroughly while the fruit is young; prune them correctly; cultivate your trees, or your vines as the case may be, thoroughly; gather your fruit in the proper time; put it up in the proper shape; handle it carefully; put it into the hands of the right kind of men—the California Fruit Union—and ship it East, and you will be very apt to make some money out of it.

I will tell you something about the quantity of cherries I ship. I shipped to market twenty thousand ten-pound boxes of cherries this season, and I paid Wells, Fargo & Co., or the Central Pacific Railroad Company, over $2,500 to take that fruit from Vacaville to the San Francisco market, some seventy-five miles. My experience in shipping cherries to the eastern market on my own responsibility has not been favorable. A gentleman from the City of San Francisco came to my place and bought something over two tons of cherries and shipped them to the eastern market, to Chicago, St. Paul, Minneapolis, St. Louis, Kansas City, Denver, Boston, New York, Philadelphia, Cincinnati, and I think to Cleveland, Ohio. He did not make a success of it, but I was satisfied at the time that he would not make a success from the fact that he did not pack his cherries in the proper shape to go that distance. He was like many, a little too greedy. The contract was that I was to pick the cherries for him and under his direction he would send a man to my house to superintend the packing or boxing of those cherries, and he insisted on filling the boxes too full. He used the common strawberry box, which, as you know, is a little box about two inches deep, eight inches wide, and sixteen inches long. I insisted on it at the time that it was not the proper box to ship cherries East in, but that was what he used and he had his man superintending the packing of them, and filled them too full, so that in nailing on the cover there was scarcely a box but what the cherries were bruised before they left the packing house, and of course they could not go a six or eight day journey in good order. If I were going to ship cherries East, I would use a box about the size of the strawberry box, one third wider, and have the ends higher than the sides, and fill the box about even full with the sides, and tack a piece of blotting paper across on the ends, leaving a space between the cherries and the paper, and I would nail the top on to that so there would be a space between the fruit and the paper, and a space between the top and the paper. I am satisfied that I can ship cherries from here to New York City, and they will arrive there in good order, some varieties in particular, the black Tartarian, the Royal Ann or Napoleon Bigareau, and the Great Bigareau; any of those will go to New York City in that way.

Mr. Chapin: What space would there be between the cherries and the paper?

Mr. Smith: I would leave about one half inch between the paper and the cherries. The blotting paper would take up the moisture arising from the cherries and would keep them dry and firm, and if the package should happen to be packed upside down the cherries would not bruise as they would if they fell against the cover of the box itself. If the blotting paper would cost too much, I would use a very thick, heavy wrapping paper, such as is used in wrapping hardware, which would answer about the same purpose, though I do not think it would be as good as the blotting paper.

RAISINS.

Mr. Bettner: I want to say a few words in reply to the remarks of Mr. Smith about raisins, which, as I understood were, that if we had a duty of 2½ cents on raisins it would be one of the most profitable of industries, and he would go into it. We have a duty of 2 cents a pound on raisins.

Mr. Smith: What I meant was an additional tax of 2½ cents a pound.

Mr. Bettner: As a matter of fact we do compete very well now with the raisin makers of Europe, although we would like to have the extra duty. The raisin business at present is a profitable industry in the southern part of the State, and promises to be. All the raisin grapes in Southern California that were sold this year were sold at an average price to exceed $20 per ton, and the men who bought them are making money in curing and packing them at those prices, although they have some considerable risk to run, and I need not tell you that selling grapes at $20 a ton you can make money out of a raisin vineyard in a suitable locality. In Southern California there have been instances where vineyards have yielded seventeen tons of grapes to the acre; that is an excessive yield, but an average of from five to eight tons is quite frequent, and there is no trouble in making a profit on that. There are several reasons why we can compete with the Malaga growers although they have so very much cheaper labor. First of all the average yield in Malaga is nothing like so heavy as it is in California. Then again the American understands how to save in labor appliances, and we have appliances for turning and handling our raisins which they do not, so that although their labor is so much cheaper I venture to say that it costs them not so far from what it costs us, and that I can state to this convention that the raisin business is a profitable business to-day in Southern California, and, so far as indications point, is going to be for years to come.

Mr. Rice: The Massachusetts Horticultural Society published a report that is tabulated from information received from all the principal fruit growers of that section of the country, giving the best varieties of all the different fruits grown—giving say the five first best varieties and the five second best varieties in each line. I would like to ask of our State Horticultural Board if it is possible for them to compile such a statement.

Mr. Hatch called for Mr. Sol. Runyon, of Courtland, Sacramento County.

Mr. Runyon: I did not come here for the purpose of making speeches, but that I might look around and see what was being accomplished in this locality. As regards the varieties of fruit best adapted for shipping purposes, I can only say what in our section of country we make the most money from. We are shipping East from my neighborhood pears, peaches, plums, and prunes, mostly. The Bartlett is the leading pear, the Seckel comes next. Other varieties do not succeed; they are too early, while at other places not a hundred miles from there they do succeed. On our peaches, plums, and prunes of different varieties, the Sacramento River can hardly be beat in this State, and the varieties best adapted to shipping from our section are the yellow-fleshed peach, the different varieties of the Crawford, the Yellow Cling, the Lawler. As to prunes, we ship what is termed the Hungarian prune and the German prune.

Mr. Wilcox: At New Orleans our fruit was superior to that brought from any part of the world. There is not an apple grown east of the Rocky Mountains that compares in size, or that is as clean and large as your White Winter Pearmains. There is hardly a variety of apples grown here that they recognize as a specimen of the same variety grown in the East. When Marshall P. Wilder, who has been President of the American Pomological Society from Boston, visited our oldest orchard, from which, probably, the first fruit was shipped East, now owned by Mr. Block, of Santa Clara, he and his companions examined the fruit, and did not know it, could not place a name on it, and it was grown on trees that some of the party had shipped to this State. As to going to Massachusetts to find out the best fruits to raise, that is impracticable. We could not afford to do it. What we want is the best fruit we can raise in our locality. Here we have the best deciduous fruits raised probably in the world. Most of our pears originated in France, but the French table in New Orleans did not compare with the California table. There were men from Massachusetts at New Orleans who claimed to know that we did not raise a good apple. I took a Rhode Island Greening and asked them if they could tell the variety. They did not know it, and it was not as clean and large as some which are on exhibition here. So far as our locality is concerned I would not try to hunt anything better if I had a good location for the White Muscat grapes, but I have not. I must raise such kind of products as my soil is adapted to. Near my place there are pear trees a hundred years old. I am going to raise pears. A heavy adobe soil where water comes close to the surface seems to suit them. I had twenty-four acres of blackberries that I am going to plow up, and I am going to raise prunes on that heavy land. I have an idea they will do well.

NOMENCLATURE.

Professor Husmann: I think I can offer some suggestions as to a matter that will benefit us all, and which every fruit grower in the State should consider; that is, to bring some sort of order into the almost inextricable confusion into which fruit culture has grown. That is a question of names, of varieties of names. This is clearly shown by the exhibits here both of apples and pears, which are improperly labeled. How can you tell a man what he is to plant, when he does not know whether he gets that variety or not? We want a competent committee in each district of this State, working together, reporting to the State Horticultural Society, to try to bring some order out of the confusion. I wish to make a motion that a committee be appointed here to take into consideration the nomenclature of the fruits of this State, and try to bring some order into it, and to report to the State Board of Horticulture, at San Francisco.

Mr. Shinn: The matter of nomenclature is exceedingly important, but to accomplish the great object is a herculean task, and I would not like to be on such a committee. I believe if the committee were appointed to report at the next meeeting of the State Board, it would do some good; but it would be years and years before it could be fully accomplished. If the committee is appointed, I hope it will be a general committee from different parts of the State, large enough to have a member in each locality, who will be wide awake at all exhibitions of the fruit interests of the different sections, making comments upon it and reporting at the different meetings and to the Board of Horticulture.

Dr. Chapin: This subject is one of vast importance, and of vast proportions as well. I feel that I am safe in saying that there is not a fruit grower in this State that can go around this exhibit in this room and name every exhibit accurately. I know for one I would find it utterly impossible to name the fruits that are here exhibited. The fact is that in different localities of the State conditions prevail that are so widely different that the same fruit, which has peculiar characteristics in one locality, has entirely different characteristics in another locality. The White Winter Pearmain apple, as seen here and grown in Southern California, would hardly be recognized as the White Winter Pearmain of the northern part of the State. It is much the same with other apples that I might mention here. I have heard some of the most eminent pomologists of the coast in dispute about the names of certain apples that are on the plates in this hall to-day. I believe that this committee should be selected with the greatest care, and should have the most ample time in which to work in the most thorough and complete manner, in order to accomplish these most important objects.

Mr. Garey: This is a great task, but if we do not start about it we will never make any progress. It would probably be a whole year before a committee of this kind can make an intelligible report. I think it should be started in some way, and that very soon. I move that the State Board of Horticulture be requested, by this convention, to appoint a committee of five, to be known as a "Committee on Nomenclature" of the fruits of this State.

Professor Husmann: In connection with this motion I will state here that Commissioner Colman, of the Department of Agriculture, has taken one very important step in that direction already, by appointing a special horticulturist—an office that never existed before—in the person of Professor Bandman, of Geneva, Kansas, one of the most prominent horticulturists in the country, and he will do all he can to aid this committee, as he will visit us next summer.

Mr. T. J. Berry: I have been engaged in raising fruit since 1856, in the State of Illinois, and State of Mississippi, and State of Oregon, and State of California, and also have been some time engaged in handling fruit in New Orleans. I have always been a close observer of these matters, and found that certain varieties of fruit assumed different characters as they came from different localities. I can speak particularly of the Bartlett pear, as, for instance, grown in Mississippi, in the vicinity of Grand Gulf, and placed on a plate with one grown in Ohio. They rarely present the same form, nor have the same flavor, the same lusciousness, or the same general appearance, yet they were propagated, to my certain knowledge, from the same identical growth. Now, the Bartlett pear of New York is entirely different from the Bartlett pear of the West. The Bartlett pear of California is entirely different from the Bartlett pear of the East, and just as this gentleman says who has this orchard at Vacaville, Mr. Smith, the reason why the Bartlett pear there is so profitable is, that it is an early fruit. You do not want to raise fruit for size. Consumers are often more numerous for small than for large fruit, and you want to raise the fruit that will sell the best, and when you come to name your fruit it will be necessary to raise it for the particular locality in which they grow. The White Winter pear grown here is finer than in any other portion of the State; plums grown in Sacramento and Santa Clara Counties are the finest. In Los Angeles County the grapes are the finest I ever saw, and I handle a great quantity of grapes. How, then, is the mere name to satisfy the man who wants just such a quality of grape? How are you going to classify them to satisfy him?

MR. HATCH: I would like to correct one little mistake. It is this: the Vacaville country does not produce the earliest Bartlett pears, while it does produce the early cherries.

WHAT FRUIT TO PLANT.

MR. SMITH: I would like to call your attention again, to a question that has been asked so often: What is the best fruit for us to plant to make money out of? The best answer, I believe, that any gentleman in the State can give, is: "Plant that that does best in your locality." The reason for it is this: Our climate, our soil and other circumstances are so different and so variable that no definite rule can be given on that point; consequently observe what does well in your own locality and on your own soil. There ought to be between every man's mind and his own soil a well regulated communication or understanding. He should know the soil of his own farm; then it is not a hard matter for him to determine what to plant in his own soil that will succeed. If you plant what is best adapted to your own locality and your own soil and take good care of that, you will not miss it.

The motion of Mr. Husmann was carried, and the convention adjourned until half-past seven o'clock P. M.

DISCUSSION ON FIG GROWING.

The convention reassembled at half-past seven o'clock, W. M. Boggs in the chair. The discussion of the culture of the fig was declared in order.

MR. MILCO: A year ago, at the meeting in San Francisco, I presented before the convention a white Adriatic fig, in not only the green and ripe state, but also dried. I did it so that the public and fruit growers might judge of the quality of the fig. Now, of course, it has been the custom of nurserymen, and I am one of them, to recommend different trees and different qualities of fruit before you see the fruit, but my idea is, that if anybody has a new thing he should show the fruit, so that people could see the quality of it, and so on. Now, I will be glad to answer any questions about this fig, because I was the one who introduced it and brought it before the public. I gave it that name because there have been a great many figs that are called Smyrna figs, and in order to distinguish this from any other fig I named it the White Adriatic, simply because I was born by the Adriatic sea in Dalmatia, and that fig originally came from Dalmatia. I hope that the people of Southern California will try it. I wouldn't recommend any one to buy one thousand or ten thousand trees. My advice is to try a few trees and see what they will do, and, in a couple of years after you plant those trees, if you find they do well, you can propagate your own trees until you can't rest. I believe the White Adriatic is the only fig you can grow with profit, to dry, in California; and you can ship them. If we should happen to be successful in sending our fruit East through the fruit union, my opinion is that the White Adriatic can be landed in the ripe state for table purposes in New York City without any trouble, and if we can show such a fig as that in New York City, I will assure you that we shall be able to realize good profits from them. Mr. Hixson tells me last summer he received a few figs and they brought fancy prices in Chicago. There is no fruit so easily cultivated and taken care of as the fig; for the fig will grow anywhere.

A DELEGATE: Will it do well on comparatively dry land, with the surface water sixty feet from the surface, without irrigation?

MR. MILCO: I think it will if you start it for the first year or two. In my country it is never irrigated. Such a thing as irrigation is not known, and figs do finely.

MR. LOOP: I will ask if this is the variety known as the fig of Genoa?

MR. MILCO: I can't tell. I never was in Genoa.

MR. LOOP: There is a fig cultivated in Riverside which they call the Genoa, which was larger than any variety of white fig which I have ever seen in other countries, and as near as I can remember the fig at Riverside was really richer than the one we ate in Genoa.

MR. MILCO: Dr. Eisen has written a letter to the "Rural Press," wherein he stated that this White Adriatic was introduced from Italy, which was not the case, and he also spoke about the White Genoa fig, which he also recommended. I, in return, wrote an article concerning the State Fair and invited anybody who had the White Genoa to send it along, so that we could examine it. As I said before, people now-a-days are not going to believe anything until they see it, and I advise in the future any man that wants to grow anything in the way of fruit trees, not to buy anything until he sees it, and then he will be apt to get something that he wants. There are several characteristics about that fig that I wish to state. One is, that if you give the White Adriatic fig too much water, the figs will burst on the tree before they are ready to be picked, and some of them will actually rot on the tree. Too much water won't do. You can regulate that. Still, they want some water in countries where it is dry, and my opinion is that generally in Southern California you will have no trouble to grow the fig any more than you will the orange or anything else, and it will pay you more than anything you have ever grown.

A DELEGATE: An orange tree is the most troublesome tree to grow there is.

MR. MILCO: Where I come from we have ripe oranges and lemons all the year around, and we never water them.

A DELEGATE: Do you have summer rains?

MR. MILCO: Once in awhile we have, but not to speak of. I don't think we have as much rain in that country as you have here. It is similar to Los Angeles and not far from the coast, and you can pick ripe oranges there all the year round, and lemons also; but this White Adriatic fig particularly, I know, is adapted to California, because we have tested it fully in the San Joaquin Valley and know what it can do, and I cannot see any reason why it will not do well here.

MR. SALLEE: In summer the excessive heat caused almost the entire crop in the valley to rot and drop off the tree; was that the case with this fig?

MR. MILCO: I have never noticed this fig lose its fruit at all, but of course in a case of extreme heat that may happen to any fruit tree. We have had it 115° in the shade this summer, and 105° to 110° at midnight. We irrigated our trees about twice a year. in the spring of the year after the rains were over, and then again about the middle of July; not flooding them, mind you, but just running the water alongside in ditches so that the ground could be soaked.

A DELEGATE: Does the tree bear two crops or only one?

MR. MILCO: They ripen about the fifteenth of August, and continue to ripen up to this time, almost one crop continually.

A DELEGATE: How is it, if they produce but one crop, that they commence ripening so early, and continue so many months?

MR. MILCO: That is something peculiar about the White Adriatic. I suppose I have now five or six varieties of new figs that I have imported from Europe, of which the first crop will be very valuable, and the second no account at all. The reason I make a distinction between the first and second crop is that there is a lapse of a month or six weeks during which you cannot pick any figs at all; with the White Adriatic from the time it begins to ripen you can go every day and pick a certain amount of fruit right along, until the winter and frost overtake the last fruit.

MR. HATCH: I would like to ask if this crop you speak of is not in all respects similar to the second crop on our black figs?

MR. MILCO: Very much.

MR. HATCH: The only difference being this, that we have two crops on our black figs by getting a small first crop on the wood formed the season before, while the second crop all comes on the wood of the season in which it is borne, and continues to come as long as those branches continue to grow.

MR. MILCO: That is what I desire to explain. On the White Adriatic the young figs are grown entirely on the wood that is grown this summer. You will never find a fig of that sort on the old wood at all.

MR. SALLEE: In an orchard that I had charge of this year are two kinds of black figs; one dropped off the tree when it got ripe, the other, a smaller fig, which hung on to the tree and dried. The skin was very soft, and smooth, and thin, and the fig was very rich and sweet. I would like to know the variety of it.

MR. MILCO: There are two varieties of the Ischia fig, one large and one small; the circumference of that is scarcely larger than a 25-cent piece. Is that about the size of your fig?

MR. SALLEE: A little larger, probably.

MR. MILCO: I think it is, as near as I can remember that fig. It is not worth growing unless you want to grow them for shade trees, because if you have ever so many figs of that kind it would not pay you to market them. It is something like growing Flemish Beauty pears when you can just as well grow Bartletts.

MR. LOOP: I would like to know if you are familiar with the fig known as the Brown Ischia, a fig we have got, I think, from Mr. Garey—one of the largest figs we grow.

MR. GAREY: I think the fig Mr. Loop speaks of, the Brown Ischia, is one of the finest figs we have—one of the most prolific and early bearing. It sometimes bears the first year; certainly bears the second year from the cutting, and is very fine, but you can't dry it; it is too full of juice.

MR. MILCO: There has been quite an inquiry made for this San Pedro fig. Some twelve or thirteen years ago I imported a lot of those figs and sold them, and of course some of those figs have been scattered all around, and this year, for the first time, I have seen the fruit from any particular tree that came from my stand; at least the man claims that it is one of those trees. The fruit don't look like the San Pedro at all. For that reason, I say, don't pay any attention in the future to the San Pedro until you can see the fruit. We have had several varieties for three years in the nursery; set out far enough apart so as to see the fruit, and to our surprise, the fruit is falling off, and we can't say now what they are. Of course, I know where they came from. My own father sent them to me, and I knew the trees before they sent them, but I don't want anybody to take those trees, or have any confidence in them, until we show them the fruit, as we do the White Adriatic.

Mr. Sallee: Tell us something about

DRYING THE FIG.

Mr. Milco: I will confine myself to the White Adriatic and the Black California. The Black California, if properly dried, is not a poor fig by any means. If well dried it will be almost as soft and fine tasting as our best Adriatic. Still, being black, there is something against it. Do not allow your figs to dry on the tree. Do not pick them off the ground, as some people do, but as soon as your figs are dead ripe, so they are quite soft, and you see white seams on them, and the fig commences to wilt a little, then pick it carefully. Pick it by the stem; do not pull it off. There is no necessity of cutting it with a knife; pinch it off and lay it in a basket and then spread it on basket-work trays. Where I came from they have them made for that purpose from four to five feet wide, and eight to ten feet long, and have it arranged so that there are little holes between.

A Delegate: How would the wire trays do, such as are used in a drier?

Mr. Milco: I don't know as that would be as good, because the wire may have some influence from rust or something of that kind. I would rather recommend boards if you can't get the basket material. Spread the figs one after the other. Do not put two together, so that they will touch each other, but give them plenty of room.

Mr. Smith: What would be the objection to using trays we have for drying raisins on?

Mr. Milco: I think they will answer every purpose. If you have your figs out on the trays about five o'clock in the afternoon in August or September, they should be covered or taken in to prevent dew falling on them, or your figs may mold and will be soft.

A Delegate: What is the necessity if you have no dew?

Mr. Milco: If you have no dew you need not protect them, and if you can cure raisins without covering them, you can dry figs in the same way. Another difficulty in drying a fig in this country is, we have so many wasps and bees and all sorts of insects, and flies, and the fig being so sweet, the wasps and bees and other insects swarm around them. The best thing I can think of is to have a covering of wire, so that the insects cannot get to the fruit, and the rays of the sun could go right through into the fruit.

Mr. Sallee: Did you ever try the oiled paper over figs in drying? This year the McPhersons are drying almost all their raisins under oiled paper, and the heat is greater. In fact, it is too great for the grapes when they are first put out.

Mr. Milco: I think it requires the sun; the heat alone will not answer. During the State Fair we had some dried figs, and there was a man from Oregon who had a drier, and he wanted to try some of the White Adriatic to see whether he could dry them in his drier. I gave him half a dozen of them. He dried them and brought them back. They were no account in the world. They were black—something like those figs over here that Mr. Eisen sent. Mr. Eisen has the genuine White Adriatic fig, but the samples he shows are too dark for the White Adriatic. The treatment he gave them is something that made them too dark for a white fig. I attributed it to something of that sort. In tasting the figs that this man put in the drier, they retained all the milky taste of the fig. They were worthless; you could not use them at all. For that reason I think the rays of the sun are necessary to take that milk out of the fig, to perfect the drying. Another thing: About every other day each one of the figs has to be turned over, and just as soon as the last spot of green disappears, and the fig appears perfectly white, then they are ready to take indoors. After they are taken in we take a large kettle of boiling sea water and using a perforated bucket, we place quite ten or fifteen pounds of the figs at a time in the bucket, and dip them into the boiling water for a second or two, and instantly turn it right over and spread them over the trays, the same as before, and almost instantly they are dry. The mixture don't stick to them at all, and in the course of a day or so after the air strikes them they are ready to be packed away. We packed them in almost all different styles, but I think the best way to do it is to pack in tin cans.

MR. SMITH: Do you think common salt water would do the same thing as sea water?

MR. MILCO: I think it would, but it might be better to get some chemist to give you the proportions to make it nearly the composition of sea water.

A DELEGATE: How long a time does it require to dry?

MR. MILCO: In the early part of the season, in August I think, it would take about six days, but later on it requires a little more, sometimes; it will take from ten to twelve or fourteen days to be completely dried.

MR. GAREY: To my mind the process Mr. Milco gives will have to be improved upon, or we wouldn't want to go into fig culture.

MR. MILCO: My idea is that if something were done in the shape of that box that our friend sent out from the East (the "ripe fruit carrier"), with little partitions of wire gauze, so that each partition would be placed in a different place, the sun could strike from all sides of it, and we could just turn the package right over, and it would obviate all this trouble; but the figs have to be handled very carefully.

Mr. SMITH: I see there is an objection raised to turning over, which I don't think amounts to anything. You take the empty tray and put it on another tray and turn it over, and you can do it just as well. I do not see why they should be handled any more carefully than raisins, and we turn raisins in that way.

MR. MILCO: But the grapes are very tough, and the figs are very tender.

A DELEGATE: Do figs get wormy, as do other dried fruits?

MR. MILCO: Yes; for that reason they should be dipped in salt water. That is thought to kill all insect germs that may be deposited on them, and in the meantime it prevents insects from coming. They don't like salt, as a rule, and for quite awhile there is a little taste of salt about it—not enough to be disagreeable—but after a month you would find them the most delicious fruit you ever tasted. Another thing I want to say, as a fruit grower, that no matter what you put up in dried fruit, do not send anything to market in a loose way, but brand with your name and the place where it is grown, and then if you have built up a name for your fruit, people will know where it comes from, and send for it. My advise is never to imitate any one else. Always try to improve on what has been done, and that is the best plan I can give you, so far as the fig is concerned. If the Black California fig is treated in the same manner as the White Adriatic, you will find that instead of bringing 3 or 4 cents a pound in San Francisco, you can get 8 cents a pound for it, and most likely more.

A DELEGATE: How about the destruction by birds?

Mr. Milco: I would go to work and plant a good many mulberry trees, and you will find the birds will go and feed on the mulberry trees in the first part of the season, and go away and leave you and the figs alone.

Mr. Garey: We are very much interested in this fig question, and feel very favorably to the White Adriatic, from what we know and hear. Mr. Eisen exhibited some at the State Horticultural Fair a few weeks ago, that were very much admired, and created quite a sensation. If it should turn out that the fig produced but one crop a year, that would be decidedly against it. If it bears throughout the season it may be called one crop, but I think, on general principles, it may be considered that it is a continuous crop right along. If this fig does that it would be a great point in its favor. We would like to know that.

Mr. Milco: That is just exactly the state of things.

IRRIGATING THE FIG.

Mr. Garey: Another thing that enters largely into the matter. I do not think you can ever make a success of fig culture for commercial purposes in Southern California without an ample supply of water for irrigation. I understand that Dr. Eisen has been writing on the subject and defending the planting of this Adriatic fig in any season; that it can be successfully produced without irrigation. Now, I think in this country the party who undertakes that will make a failure of the business. Our first figs are produced on the old wood, quite early in the season. A few of them are very large and fine, then those that are not so large, are very abundant. If we do not have an ample supply of water to irrigate, the first crop, and perhaps the second, is all we get; the balance dry up and drop off. But if we have plenty of water we keep them bearing until the frost comes.

Mr. Milco: When I stated that there was only one crop, I meant to say that from the time it commences to ripen until the frost comes it is continually ripening, so that you can get ripe figs every day.

Mr. Chubb: And in the aggregate yields as many figs as the two crops.

Mr. Milco: I do not know of any other fig that will produce anything like so much as this fig.

Mr. W. M. Williams, of Fresno: Some three years ago I got from Mr. Milco a lot of cuttings from a fig which he said had come from Dalmatia, giving him $97 for all the cuttings I could carry; I had a greenhouse and when I got home I cut those up, and out of that lot I had eighteen hundred trees. The first year they grew from four to seven feet. I had also the Black California, and I was very anxious when the fall of the year came, because we do have a little frost even in semi-tropical Fresno that might kill the figs, but anyway I let them grow. The frost bit my Black California, but my Adriatic came out unscathed by cold. I started them in the greenhouse until one little bud made its appearance—in other words, I "calloused" them—I really did not start them in the greenhouse; only once in awhile you would see a white root. That fall I cut off everything but one straight stock, and this year I started eight thousand from the cuttings of that lot, perhaps planting twenty acres myself of them, planting them not closer than twenty-five feet. They are very vigorous growers, the fruit is excellent, either green or dried.

A Delegate: What time should the cuttings be started?

Mr. Williams: That is owing entirely to the season. After they lose the leaves I would cut them immediately, and I put mine in the greenhouse as soon as I cut them and started them. But I think they ought to be cut and kept damp until along in February if you propose starting from the cuttings in the open ground.

Mr. Hixson: I became very much afflicted with the fig fever some three or four years ago and made the assertion that I believed the fig would be the coming fruit, the next fruit that would have a boom. They made so much fun of me that I began to be rather sick, but I got my friend Smith over there to believe it too, and said I would abide by his judgment. Then I kept looking to see what kind of a fig would answer the purpose and carry out my idea that the fig was going to be the thing. When I was going East four years ago, a man from Healdsburg sent down a box of figs as a sample to know whether I considered it necessary for him to sort them out. They were just put in as they came. He said it was a fair sample, but some were light color and others were dark. I suppose it was in consequence of the manner in which they were handled. As Mr. Milco said, perhaps all the milky substance was not dried out, before they turned them over, to properly cure them. Those that were ripe came so near the regular Smyrna fig, that when I was going East I had two little narrow boxes, which I carried in my pockets, and had a package of prunes in one and the figs in the other. I would show them on the railroad, and when I got to New York I went into a house there and talked on the subject of the prunes. I thought I was going to create a sensation there with the big prunes. The man looked at them, and picked up the fig and said, "That is the thing to bring the money; now you are on the right track; that comes pretty near being the thing," and told me how to make a little improvement; ought to dip them into sea water, and make the skins tender; so then I had another man to sustain me in my judgment besides Mr. Smith.

I came back home, and I think at the next meeting of the State Society I met Mr. Milco, and saw this fig, and I took a great deal of interest in it, and I think it certainly is the fig for California, and, if I am not very much mistaken, the fig is the thing that we want to plant. We do not want to quit everything else, to dig up orange orchards and plant figs, because there is so much of this country that can raise figs which cannot raise oranges. An important point in the matter of the fig culture is that the valuation of the fruit where it is grown with the duty added amounts to 10 cents a pound, so that would be the valuation at the custom house—10 cents a pound. If we don't come quite up to that and could get 7 or 8 cents a pound it certainly would be a very valuable crop. We have been trying all this year to get figs. We had two customers that wanted each a carload of figs; one was willing to pay 15 to 20 cents a pound for a grade of figs that was manipulated so as to come up to a certain standard. The other was willing to pay from 7 to 9 cents for the fig that would come up to his standard. Of course, one wanted what we call a manipulated, or rather cured fig, taken through a process of sea water, etc.; the other wanted just a dried fig, such as we get in San Francisco in sacks, worth about 2½ or 3 cents at the present time. I have been unable to get them. We have recently sent on probably as much as four thousand or five thousand pounds; I have written many letters on the subject, but we never have succeeded in getting a great quantity. I do not suppose you could get to-day in San Francisco a carload of figs.

In regard to shipping the ripe fig, we made probably three or four shipments last year. I believe they all came from Vacaville; some were shipped in ten-pound cherry drawers, and they were three deep in the drawers. They were all rotten. I do not believe you could get one you could sell. A few lots were put on trays without being piled up, and they came through in very nice condition, and were snatched up at once. I do not remember the price, but it seemed like a tremendous price to us, and it was very evident to my mind that a liberal supply would sell very readily at good prices. If we get the refrigerating cars that will keep an even temperature, then we can carry the figs very well, and I think Mr. Milco's fig, judging from what attention I have given it, would carry more safely than any of the black figs we have.

MR. LOOP: Is this fig, in your estimation, equal or superior to the white fig of commerce?

MR. HIXSON: I could not tell. I never saw any of these dried. I think the fig that I saw Mr. Milco have down to the fair, when dried, was as fine in point of texture and the gelatinous matter, or whatever you call it, and in richness, as any fig we have imported. They were not put up quite as nice, of course.

BUDDING THE FIG.

MR. GRAY: I would like to ask if any one has had any success in grafting the fig.

MR. SMITH, of Vacaville: I have had some experience in budding the fig; very little in grafting. It is rather a difficult tree to graft, from the fact that the wood is very soft and pithy.

DR. CHUBB: Dr. Congar's machine will graft anything.

MR. SMITH: I never tried that. You cannot take off the bud, as with the peach bud, or the pear bud, and insert it in the same way. You must cut the ring right around the limb, say from three fourths of an inch to an inch long, with the bud on it. Then take off another ring of bark from a limb of the same size; open the ring which has the bud you want, and slip it into that cut, and bind it around with cloth, covering it up to exclude the air. There is one precaution you must take. When you cut into a fig limb when the sap is up, the sap will exude from the limb. You must cut off your bark with the ring in it, and you whip off the limb, leaving the stock where you insert your bud, and then insert the bud. In this way you can bud quite successfully; otherwise you will fail almost every time. The reason is this, that the milky substance that exudes from the limb or bark seems to sour, and poisons the sap when it comes up the stock, and prevents the bud from uniting with the limb, whereas, by this treatment, it does not poison the sap, and the ascending sap will unite with the sap of the bud.

NEW FRUITS.

While I am on the floor there is one other thing I wish to mention. Mr. Milco referred to it somewhat, and I desire to emphasize it, and that is, in buying new varieties of fruit never buy many of them at a time until you know what it is. You can afford to buy one or two, and pay a high price for it, which you are almost sure to do in buying any new variety that springs up. Now, I have been hunting for a certain kind of peach for the last ten years—have bought almost everything in the way of peach that has been brought out in the United States and even Europe—and nearly one half of the time I will not have a new peach, but something I have had in bearing on the place a number of years under a new name. If anything new comes up, and you want it, buy a few and prove it before you go into it to any extent. I have about sixty-five varieties of peaches on my place that I am testing, and I will say that one half of those are old peaches that have been in cultivation a good while, sprung up under new names by some one who wanted to make money. A tree or two is sufficient to test a new variety. Prove it on your own place, and then, if it is worthy of propagation, you have plenty of time to go to work and propagate them.

Mr. Gray: Speaking about shipping figs, I had an order last year from up in the mountains. They must have some figs. I put him up a box of green figs. He came down in a couple of weeks and said they had all rotted. He wanted me to try it again. I went and picked some that had begun to wilt a little and packed them in a ten-pound box, four deep, and in between the layers two or three thicknesses of paper, and put up three or four boxes. He took them in a lumber wagon for five days going up, and when he came down he reported that every fig was in good condition when he got there. They were the California fig. I think that picked at just a certain stage they can be carried to Chicago perfectly well; certainly if they were put up in packages not so deep.

As to peaches, last year at the horticultural meeting we had quite a nice discussion upon new peaches that had been propagated in different parts of the State, and created quite an interest. We had one peach which came to us by accident this year, and I would like to speak of it. It was an apricot tree that was budded on a peach and broken off, and the sprout came up, and we trimmed it and let it stand right there. I forgot all about the tree until the day before Grant was buried. I happened to be going through the orchard and there was this tree loaded with a very large yellow peach, freestone, and I think the largest peach I ever saw. I think that was really the shape of the Orange Cling, though a good deal larger than they usually get. It was very yellow with a reddish cheek, very solid meat, freestone and small pit. I think it is going to be a very valuable peach.

A Delegate: How is it compared to the Solway?

Mr. Gray: It is a very much better peach than the Solway. I think it is a little earlier, perhaps a week. It is a seedling we know. It is a sprout that came up from the root. We had a few trees that we called the St. John; perhaps some here know more about that than I do, but I believe that we haven't anything growing now that is nearly equal to it. It ripens very soon after the Crawford's Late, and is very near the size and shape of an Orange Cling.

Mr. Smith: I think you have something else than the St. John. The St. John, properly speaking, is the earliest yellow peach in cultivation in the United States. Some gentleman asks for the best two varieties for canning. If I were going to plant two peaches for canning of those which are generally known and in extensive cultivation, I would take the Susquehanna and the Solway. I do not know whether they would suit your part of the State or not, but they come nearer filling the bill in our part of the State than any peaches we have got.

Mr. Williams: Have you tried any of the Sellers?

Mr. Smith: Yes, sir, I have—both Sellers Cling and Sellers Free; also, the Muir. I think that is the best drying peach in the market.

THE MUIR PEACH.

Mr. Webb: The manager of Mr. Lusk's canning establishment told me that they would give one quarter of a cent a pound more for the Muir than any other peach for canning purposes. They say that the reason for it is its marvelous sweetness. It has more sugar in it than any other peach.

Mr. Smith: The Muir peach is a new peach, which is propagated only in our section of the country. It is, as I said, the finest drying peach in the market. I will give you my reasons, and I believe you will agree that they are good. It is a perfect freestone; the pit is very small—as small a pit as you will see in any peach of good size; and instead of turning to a dark color when it dries in the sun, it will gradually become whiter as it gets drier, a property I never saw in any other peach in my life, and I have been drying peaches for twenty-five years, more or less. It is very dry of itself; it is very fine meated; you take a knife and cut it open, and it will slip through like a hot knife. These are all good qualities in any peach. It is nearly the color of a lemon; it really ought to be called the Lemon Free. Where they are exposed to the sun they have a little red blush. The peach has some objections, or rather the tree has. About one third of the crop will be inferior in size, while the other two thirds will be full sized. Another objection to the tree is, that it is hard to manage in the orchard. The brush is very fine, and it is not a rapid grower. The leaves are quite small and very much softened about the edge.

A Delegate: Other things being equal, which is to be preferred—the free or the cling for canning?

Mr. Smith: My opinion is that the clingstone will eventually be the canning peach, for as a rule clingstone peaches are firmer than freestones, and now there are being machines invented that will pit clingstone peaches as quickly as you can pit freestone peaches. If you want to plant now for canning in the future, I would plant one half of the orchard in clingstone peaches, anyway. The sweetness of the Muir peach has been spoken of; it is a very sweet peach—more so than usual. I have a cling peach, yellow, almost as round as an orange, no red about the pit. The pit is very small and is very similar to that on the outside. That is a sweeter peach and cans better than any peach I ever saw; it is a clingstone peach, and when it becomes known it is going to be one of the leading peaches for canning. I don't know of anybody else that has it but myself and the old lady that I got the buds from near Napa City; an old lady named Porter, and the peach is named Porter. It was an old seedling tree in her yard.

A Delegate: Will you mention other clings for canning?

Mr. Smith: If I were going to select two cling peaches for canning, I would take what we know as the Sacramento River Orange Cling, or the Runyon Orange Cling, or the Canada Cling, or the California, and there you have three or four different names for one and the same peach. I will mention that as one peach for canning. For a yellow cling I would mention the Tippecanoe; I know nothing better of yellow clings for canning than those two. Now, I have another, a white fleshed peach, that I got from Texas, one of the finest flavored peaches I ever tasted, and being a white peach would be fine for canning were it not that it has a little red pit and when you cook it every bit of it goes to the syrup and colors it. That is a serious objection to it.

As to the fig, I suppose there is no place that grows more than Vacaville; the first figs that go the San Francisco market go from my neighborhood. The principal one in cultivation is the common California blue fig; a fig, I suppose, the old Spanish fathers introduced into this country when they first came here, the same as they introduced the common Mission grape. We have no fig that does better than that does, and no other fig that pays us so well. We are certain of two crops, and when we have a late, warm autumn we get three, and a man that gets three crops on a piece of land is pretty apt to get a good one. The first crop we take to the market fresh, the second and third crops we dry the most of, and put into the market as dry figs. The first crop grows so large that we cannot dry them.

A **Delegate**: How do you gather the figs off of those large trees?

Mr. Smith: We have stepladders eighteen or twenty feet long, and we get up and gather all we can in that way; the second crop we usually let dry and drop off, and pick them up off the ground. We have tested several other kinds of figs in our section of the country, with a view of getting something better than the common California fig; as yet, we have not succeeded. We are trying to get a few that we can grow and pack, or put up in the same style, or that will answer the purpose of the real imported Smyrna fig. We want to see if we can't equal those, or surpass them, if possible, but as yet we have not found the fig that will do it, unless Mr. Milco's White Adriatic will fill the bill. Gentlemen, I am satisfied of the value of the fig, and I will corroborate what Mr. Hixson said awhile ago: There is no one tree we can plant in any section of this State where the fig does well, that we can make more money out of, and make it easier, than we can out of the fig.

Mr. Hatch: I want to say a few words about the Muir peach. I want to speak a good word for it. When it was introduced I planted several in my place, and I was out in the orchard when peaches of that variety were ripening, and when I found the peaches on the young trees, I said to myself, I wish all of my peaches were Muirs, for different reasons. In the first place, on account of the seed, a small pit about the size of the first joint of your little finger, with a very slight pink tint. Another thing, Mr. Prather, often a buyer for A. Lusk & Co., of Temescal, said, in a fruit convention in San Francisco lately, that it was the best peach they ever had to can, one peculiar characteristic being that the cooking never mushed it. In that respect it is similar to a cling, and, being so easy to remove from the stone without waste, is preferable to the cling.

A **Delegate**: Does the leaf curl?

Mr. Hatch: Not to my knowledge. I have never seen them curl. I have only had them two seasons. In regard to the growth, I was surprised to hear Mr. Smith say the wood was willowy and the leaves small. It is not so with me. It has good growth, large stock, and large leaves, and is a very thrifty, good growing tree. Trees planted from dormant buds last winter, starting the year ago last spring, are higher than I can reach this way, with a spread as wide, and this year produced some peaches, but not many. Another thing in regard to the fruit is, that most peaches when overripe become distasteful. I found these peaches on my trees almost drying up, they were so ripe—so ripe they were very soft, and yet the taste was delicious, something very peculiar in a yellow peach.

While I have the floor, I want to say something in regard to the general subject in discussion to-night, which, I believe, is in regard to such fruits that have not been overdone, or for which there is apparently an unlimited demand. There is a kind which will require to be put in good packages, which can be produced in every locality in the State, for which there is no end to the demand. I was in hopes you would ask me what kind of fruit it is. It is *any* fruit which you can produce *better than any other* in the locality in which you live; grow that and put it in good packages; there is no end to the demand for it.

Mr. Wilcox: One thing in reply to Mr. Williams. I can answer about the Sellers peach; that peach was originated by my wife's sister, Mrs. Sellers. There are two kinds, the freestone and the clingstone, and they are regarded as a very superior peach. The few that were raised four or five years ago sold to the San José cannery, and the next year the entire crop, of about an acre, sold for 4 cents a pound.

Mr. Shinn: A few words in regard to the Muir peach. I was assured, by a very reliable gentleman, two years ago, that it has a property which has not been mentioned here to-night, and is certainly the most valuable property that it has. That, whereas, in ordinary freestone peaches, it requires six or seven pounds of green fruit to produce a pound of dried, the Muir peach will produce a pound of dried peaches from four pounds. That is a very important point. In reference to the Sellers peach, I procured the original buds from the sister of Mr. Wilcox, in Contra Costa County. The peach was sent to me as a very valuable one, and I was requested to enter upon the culture of it, and·I did so, and saw at the moment that it was a very valuable one. I wrote to know all about it before I would have anything to do with it, and the lady said that all she knew of it was that there is a stray tree in the pasture growing without cultivation, with no attention paid to it, and it always grew large valuable peaches; the canners always thought very highly of it, and she said she was always persecuted for buds, because it was large, and because, by the time that the pit is extracted by the machinery that is now used for the purpose, there will scarcely be a line of red upon it, and of course they liked it on that account. Now, it is worth while to say, after all the consultation I have had with the canning factories, and their Secretaries and their Presidents, with reference to peaches, that upon the whole they prefer the yellow peach; that is, they want more of them, but they do not want a white peach; they consider it of the greatest importance to find one that is white to the pit, and until the McKevitt peach was found, I know of none that was a good peach and didn't curl.

MR. WEBB: How does it compare with the Lyon Cling that was exhibited last year by Mr. Williams, of Fresno?

MR. SHINN: I do not remember. I have paid great attention to peaches, and if I were to advise any one in reference to planting peaches, I would give the same advice that has been given to you, plant such as succeed well in your neighborhood, avoid all that are liable to curl, no matter what other qualities they may have. It ought to be said that most of the canners that I have anything to do with, say that they do not like the Solway peach. The Susquehanna is certainly equal to the very best for canning. Everybody knows that the Crawford Early is a very popular peach, and so is the Foster, but it should be remembered that they ripen so nearly together, and a person planting is not obliged to plant both for a succession. He had better not do so, and it is my opinion that the Foster is preferable to the other. I am not speaking as a nurseryman, but as a fruit grower, and I have been growing fruit for twenty-nine years. The Crawford Late has many of the best qualities of a peach, but it will curl three years out of four. The Crawford Early has been so long in cultivation that it is but reasonable to suppose that some of its good qualities have run out. One fault is, that it is inclined to grow double. It has been grown from bud to bud, generation after generation, and it is but reasonable that it should degenerate some—still it does not curl, therefore it is valuable. But the Foster being a new peach, about the same size, I believe it is preferable to plant. The important point, if you are going to plant peaches, is to avoid those that curl, and endeavor to have a succession in the time of ripening. You cannot go earlier with yellow peaches than the Foster, for the Early St. John, though a good peach, is not desirable.

MR. MILCO: I want to ask you something about Shinn's Early White peach.

MR. SHINN: It is worth nothing. It is a nice peach in itself, but it has a tint that is objectionable. The white tinted peaches are very much more liable to curl as a rule than the yellow peaches.

THE ADAPTATIONS OF VARIETIES.

Dr. Chapin: I do not lay claim to being an extensive peach grower, but I desire to call attention to this fact which is one of the most important ones in this whole discussion of fruits. Taking the peach, for instance, we must be extremely careful how we plant upon the assumption that any one particular variety or two or three particular varieties are adapted to every locality where peaches are grown. Some of the peaches that have been named by Mr. Smith this evening as being extremely well adapted to his locality, to Vaca Valley, are utterly worthless in many other localities of the State, and it would not be wise for you to plant upon that assumption. The peach of many names, which he has given to you to-night (the Edwards Cling, the California Cling, and many other names attached to that one peach), in Santa Clara Valley is a perfect failure. I have planted it from buds and dormant buds and the tree itself is a very serious failure, has curled leaf and the fruit is very inferior indeed. I have made experiments with quite a large number of peaches, with a view of finding a few good peaches for family use in the portion of the Santa Clara Valley in which I reside. It is not a peach locality, and it is useless to attempt to grow peaches for market purposes in such localities. The best success that I have had has been with certain California seedlings. I may mention that among the very choicest of those has been the Sellers Cling, the McKevitt Cling, and another, the Wilcox Cling, or the Albright Cling from Placerville, in El Dorado County. Another peach which is proven to be one of the very choicest for canning purposes is not known generally in the State, but it has been put up this season by the Yuba City Packing Company, a new cannery establishment in Sutter County; it is the Tustin Cling, and some cans sent to me by one of the stockholders, when turned out on the table proved to be the very choicest peach that I ever saw put in a can by any packing company in the world, and that is saying a great deal. I might speak of some other peaches. As to the Muir, that peach, with me, has not been a great success. I have it in two different portions of my orchard, and right by the side of it in one portion stands a seedling peach tree of a very similar character to that as to color and other qualities—the same peculiar appearance of the lemon color and whiteness. It is called the Orange peach, and it originated with Mr. Loomis, in the Santa Cruz Mountains. He gave me buds, and I have fruited that right by the side of the other and it was a superior peach to the Muir. It is one of the finest peaches for drying purposes, and Mr. Loomis told me, when he gave me the buds three years ago, that the returns from that were a little better than that of the Muir peach in drying. That peach, I am satisfied, will become one of the most valuable ever planted in California, as I also regard the Muir to be one of the most valuable peaches we have, and from which the best results are to be obtained. I believe these seedling peaches that are gradually discovered in various portions of the State (and some of which have not yet been heard of) and which have been found to be extremely valuable in a homestead in a single place, by the family where they originate, one by one will come to light and become disseminated throughout the State, and the good qualities gradually become known. A very choice white cling peach, perfectly white to the pit and very similar to the peach that Mr. Williams spoke of last year, is to be found in Porterville, Tulare County; it is known there as the "Sheep's Head," merely a local name for it. The farmer raising the peach don't know anything about it, excepting that it is a very fine peach. I might go through this to considerable extent and name seedling peaches that I have discovered through the different portions of the State, and many of them will become gradually known; and I am satisfied that, in the course of a few years, we will have discovered for all the various localities of the State the fruits that are best adapted to them, and then we can arrive at the conclusion as to what will be the best fruit to plant in a certain locality, and we cannot do it in any other way.

A DELEGATE: Has this peach a blush to it?

DR. CHAPIN: Very little; that is only in the skin—not a particle in the flesh. It is an oblong peach, with rather a broad and flattish stem, under a pointed sort of a nose, that somewhat resembles a sheep's head. Something was mentioned as regards the size of the fig tree. One of the largest fig trees in this State is on the ground of the Hon. Henry Wilson, a member of our Board, in Tehama County. At Snelling, in Merced County, can be seen quite a large number together of the very largest fig trees in this State. There are several trees there in the orchard of Mr. Kelsey, in Snelling, that the spread of the limbs would be a great deal more than the length of this hall.

MR. WEBB: Mr. Wilson, you cut down one of those trees; how much cordwood did you get out of it?

MR. WILSON: Sixteen cords of stove wood.

The convention here adjourned until to-morrow morning, at ten o'clock.

REPORTS ON FRUIT EXHIBITS.

At the afternoon session of the fourth day, reports of committees on fruit exhibits made during the convention, were received. Mr. Garey presented the report of the Committee on Citrus Fruit Exhibits, as follows:

TO THE STATE FRUIT GROWERS' CONVENTION: We, your Commitee on Citrus Fruits, beg leave to report that we have examined the exhibits in Agricultural Hall, and find the following localities represented by the citizens hereinafter mentioned. The display is, considering the season, highly meritorious, and reflects great credit on Southern California and the enterprising gentlemen making the exhibits from the several localities:

Santa Barbara—Ellwood Cooper exhibits one plate Mexican limes; one branch olives; one bottle olive oil, his own manufacture from the olives, very clear and of first quality; two plates and one box seedling lemons; specimens green oranges.

Los Angeles—A. Weis, Alameda Street: One banana plant with green fruit and bloom; three plates seedling oranges. J. W. Wolfskill, Alameda Street: One plate Wolfskill's Best oranges; one plate Tangerine oranges; one plate Mandarin oranges; one plate paper rind St. Michael oranges; one plate large St. Michael oranges; one plate Rivers' late St. Michael oranges; one plate myrtle leaf St. Michael oranges; one plate Washington Navel oranges; one plate Dwarf Mandarin oranges; one plate Variegated oranges; one plate Japanese oranges; one plate seedling oranges; one plate Bouton lemons; one plate Eureka lemons; one plate Villa Franco lemons; one plate Anatie lemons; one plate Bonnie Broy lemons; one plate Genoa lemons; one plate Imperial limes; one plate Mexican limes; one plate Sweet limes. Mrs. W. D. Bigelow: One box seedling oranges; one bunch green dates; this is a remarkable production, adding one more to the long list of our productive possibilities in Southern California. William Niles, Washington Street: Two plates seedling oranges. A. F. Kercheval: Two plates Mexican limes. A. Pratt, Lemon Street: One box Mexican limes. F. M. Trapp: One cluster seedling oranges; one box seedling oranges; one box Mexican limes. H. Preston: Two large and fine clusters seedling oranges; one display citron of commerce. C. R. Workman, Lemon Street: One cluster Eureka lemons, very fine; one cluster seedling oranges; one cluster Wolfskill's Best; two plates from the original tree Eureka lemons; seed imported from Hamburg, Germany, in 1872, only one seed growing, from which buds were put on orange stock. This is the famous Eureka lemon, named and introduced to the public and disseminated exclusively by Thomas A. Garey. Mr. Gilda, Macy Street: One plate Pear guava. Dr. M. McCarry: Superb cluster seedling oranges. I. W. Hooper: Three plates seedling oranges; one plate Navel oranges; one plate Mediterrenean Sweet oranges. George J. Dalton: One large fine cluster seedling oranges.

Orange—Joel B. Parker: Two plates Mexican limes; one box Mexican limes; one box paper rind St. Michael oranges; one box Lisbon lemons. Dr. O. P. Chubb: One cluster Mediterranean Sweet oranges, season of 1884-85; one cluster season of 1885-86; one plate

Mediterranean Sweet, season of 1883-84; one plate Mexican limes; one plate Washington Navel oranges.

Anaheim—Leonard Parker: Two plates seedling oranges; one cluster Mediterranean Sweet oranges; one plate seedling lemons; one plate Lisbon lemons.

Pasadena—Dr. O. H. Congar: One box Lisbon lemons; specimens of Eureka lemons. Lyman Craig: One plate Eureka lemons. D. M. Graham: One plate of Strawberry guava. M. Rosenbaum: One plate Sicily seedling lemons.

Crescenta Canada—Theodore Parker: Two plates seedling oranges.

Downey—Robert Bedwell: Two plates seedling oranges; one plate seedling lemons; one plate Mexican limes; one plate Tahiti oranges.

Alhambra—T. D. Kellogg: One plate guavas; one plate seedling oranges, season of 1884. F. Edward Gray: One plate Chinese Mandarin oranges; one plate Mexican limes; one plate Lemon guavas. A. C. Weeks: One plate Satruma Hill Glove oranges; one cluster oranges; one plate seedling oranges; one plate Eureka lemons. G. B. Adams: One plate Chinese Mandarin; one plate seedling oranges; one cluster oranges; one plate Washington Navel oranges; one cluster Washington Navel oranges. R. T. Bishop: One plate seedling oranges; one plate Washington Navel oranges; one plate Eureka lemons. J. C. Byram: One plate seedling oranges, season of 1884. S. B. Kingsley: One plate Washington Navel oranges; one cluster seedling oranges; one plate seedling lemons.

Duarte—W. P. Wright: One box Mexican limes. (These limes are of exceeding good quality, clean, bright, and of large size.) One box Washington Navel oranges. A. Boddy: One plate lemons; one plate Hornet oranges; one cluster Wilson's Best oranges; one plate seedling lemons.

La Dow (south of Los Angeles)—One plate seedling oranges produced without irrigation.

Glendale (north of Los Angeles)—Two plates Mexican limes, very fine, good quality; one box limes; one cluster oranges, seedlings, clean and bright.

Pomona—Rev. C. F. Loop: One plate Mexican limes; three plates seedling oranges; one plate all first class lemons. H. G. Bennett: One cluster Washington Navel oranges. James Smith: One cluster seedling oranges; one plate seedling limes; one plate seedling lemons. S. Duton: One plate Mediterranean Sweet oranges, season of 1884. D. N. Graham: One plate Strawberry guava.

Santa Ana—Three plates seedling oranges; three clusters seedling oranges; one plate lemons; one cluster oranges from two-year old tree. H. Goepper: One bunch green dates.

Tustin—H. K. Snow: One plate Washington Navel oranges; one plate Thomas oranges; one plate seedling oranges; two plates Genoa lemons; one plate Eureka lemons; two plates seedling oranges; samples of seedlings, Washington Navel and Mediterranean Sweet oranges, season of 1884. P. T. Adams: One plate Mandarin oranges. A. Guy Smith: Box seedling oranges, picked when quite green, evened up nicely.

In closing this report, we desire to state the phenomenal bright and clean appearance of the Los Angeles and vicinity citrus fruits. Los Angeles has earned the unenviable reputation of a "trade mark" caused by the black and unpresentable appearance of the fruit in many instances in the market.

The fruit on exhibition we find exceedingly clean and presentable in general appearance, comparing most favorably with the oranges from Duarte and other well known, first class orange growing sections of Southern California. Why this is so, can, in a measure, at least, be accounted for by the increased vigilance of our orange growers, and the better and more thorough care of orange orchards, induced by the advent of the scale bug here, and compulsory need of cleaning and caring for the orchards.

Respectfully submitted.

THOMAS A. GAREY, Los Angeles.
JAMES BETTNER, Riverside.
G. M. GRAY, Chico.

REPORT ON DECIDUOUS FRUITS.

Mr. Sol. Runyon presented the report of the Committee on Deciduous Fruits, as follows:

We, your committee, beg leave to report that we have examined the display of deciduous fruit in Horticultural Hall, believe that in merit it stands superior to any exhibit hitherto made in this locality, and highly creditable to the southern portion of the State. Many of the specimens exhibited were of unusual interest. We deem the display of White Winter Pearmain apples worthy of especial mention. The display from Downey were very fine in size. The following is the detailed report:

Downey—A. E. Davis: Three plates White Winter Pearmain. J. P. Dickerson: One plate Smith's Cider. Wm. Caruther: One plate Ben Davis; two plates Roxbury Russet; one plate Baldwin; one Yellow Bellflower; one Yellow Newton Pippin; two plates Easter Buerre pear. Unknown: One plate Kentucky Redstreak; two of mixed varieties one Vicar of Wakefield. L. M. Grider: One plate Pound pear.

Ranchito—J. W. Cates: One plate Winesap; one Baldwin; one White Winter Pearmain; one Yellow Bellflower; two Yellow Newton Pippin. Pears—one plate Doyenne d'Alencon; one Winter Nelis.

Compton—S. Rogers: Five plates White Winter Pearmain; four Yellow Bellflower; two of Winter Nelis pears. John Ganes: Two plates White Winter Pearmain; one Yellow Bellflower; one Kentucky Redstreak; one Smith's Cider; one Yellow Newton Pippin; one Nickajack; one Lawyer; one Red Romanite. Isaac Wilson: One plate Yellow Bellflower. Clinton Heath: Two plates White Winter Pearmain. E. D. Stone: One plate Ben Davis; one White Winter Pearmain; one unknown variety.

Cerritos—C. B. Paris: Two plates White Winter Pearmain; two New York Pippin; one Roman Beauty; one Smith's Cider; one Nickajack; one Ben Davis; one Rhode Island Greening; one Willow Twig; one Shockley; two Winter Nelis Pear.

Orange—Dr. Chubb: One plate Spitzenberg; one Ben Davis; one Rhode Island Greening; one White Winter Pearmain.

Duarte—A. Boddy: One plate White Winter Pearmain; one St. Petersburg; two unknown varieties.

Glendale—H. J. Crow: Three plates Winter Nelis pears; one dozen Doyenne d'Alencon pears; two Easter Buerre.

Pomona—C. H. Loop: One plate Blue Pearmain; one New York Pippin; one Canada Rennette; one Spitzenberg; one Pennsylvania Redstreak; one Polo; one Emperor.

La Dow—G. Howland: One plate Nickajacks; three Ben Davis; two Smith's Cider; two White Winter Pearmain; two New York Pippin; one Rhode Island Greening; one Winesap; one Yellow Bellflower; one seedling.

National City—James Currier: One plate Winter Nelis pears. Frank A. Kimball: Three plates White Winter Pearmains; three Yellow Bellflowers: one Baldwin; one Ben Davis; two Winesap; one Nickajack; one Limbertwig; one Roxbury Russet; one Lawyer; one Rhode Island Greening; two New York Pippin; two Red Jim, second crop; one seedling; two unknown; two Winter Nelis Pears.

Tustin—Mr. Snow: One plate Yellow Bellflower; one Smith's Cider; one Winter Nelis pears; one Vicar of Wakefield; one unknown.

Santa Ana—Dr. Elmendorf: Three plates Ben Davis; one White Winter Pearmain. A. T. Armstrong: One plate White Winter Pearmain; one Yellow Bellflower; one mixed variety; one Winter Nelis pears. F. A. Marks: Two White Winter Pearmain. D. Holliday: One Ben Davis: one White Winter Pearmain; one Yellow Bellflower; two Vicar of Wakefield pears. George Minter: One White Winter Pearmain. Unknown: Two plates Winter Nelis pears.

Newport—J. H. Moesser: One plate Kentucky Redstreaks; one Ben Davis; one White Winter Pearmain. Unknown: Two plates unknown; one Vicar of Wakefield; one Pound pear.

Pasadena—Mr. Rosenbaum: One plate Winter Nelis pears. E. Millard: One plate White Winter Pearmain. O. S. Barber: One plate Roxbury Russet; one White Winter Pearmain; one unknown. James Smith: One plate Winter Nelis pear. Edward L. Ferris: One plate December peach; one unknown apple. W. T. Knight: One plate Genitan; one White Winter Pearmain; one Red June, second crop. A. C. Bristol: One plate White Winter Pearmain. Lyman Craig: One plate unknown variety apple. Walter Coolley: One plate Winter Nelis pear. Rev. Mosher: One plate Ben Davis; one White Winter Pearmain; one seedling.

Santa Barbara—Ellwood Cooper: One plate King of Thompkins; one Roman Beauty; one Twenty Ounce; one Yellow Bellflower; one Yellow Newton Pippin; one Jonathan; one Fall Pippin; one White Winter Pearmain; one Golden Pippin.

Alhambra—S. B. Kingsley: One plate White Winter Pearmain; one Nickajack. F. E. Gray: One White Winter Pearmain; one Winter Nelis pear. R. F. Bishop: One plate Beauty of Rome; one White Winter Pearmain. J. C. Byron: One plate White Winter Pearmain.

Los Angeles—C. R. Workman: Two plates White Winter Pearmain. W. B. McQuade: One plate Fall Pippin; four plates Easter Buerre pears; one unknown pear. Geo. J. Dalton: Two plates White Winter Pearmain; two New York Pippin; one Ben Davis; one Smith's Cider. John Hooper: One plate Nickajack; one White Winter Pearmain. Milton Thomas: Three plates Smith's Cider; three Nickajack; one Tillequah; two White Winter Pearmain; two Yellow Bellflower; one Holland Pippin; one Ben Davis; one Rubicon; two California Keeper; one Dominic; one Lawyer; one Kentucky Red Stock; one Seek-No-Further; one Rhode Island Greening; one New York Pippin; one Fall Queen; one Harrison.

Respectfully submitted.

SOL. RUNYON, Courtland.
S. McKINLAY, Los Angeles.
C. E. WHITE, Pomona.
E. E. EDWARDS, Santa Ana.

MISCELLANEOUS FRUITS, ETC.

Mr. Wilcox presented report of the Committee on Miscellaneous Fruits, as follows:

Mr. President, and Members of the Convention: Your committee to whom was referred the miscellaneous articles on exhibition, not included in the citrus family and green deciduous fruits, would report as follows:

That they have made such an examination as their limited time would permit, and that they find every product included in the exhibits possessing merit worthy of notice.

Grapes.—Among the grapes exhibited are those of Sam Brown, Tustin, Santa Ana Valley. Like all the other grapes exhibited, they are of the second crop, but make a very creditable exhibit. The varieties are the Black Morocco, Cornichon, and Victoria. The Black Morocco are very large, but not well colored. N. Nisson and G. W. Minter show a few varieties of grapes, embracing the Muscat, Large Mission, etc.

Wines.—Through the politeness of Professor George Husmann, we copy from the partial report made by him to the United States Commissioner of Agriculture, relating to wines exhibited by J. H. Drummond, Dunfillan vineyard, Glen Ellen, Sonoma County, comprising the following varieties: Semillon—clear white, very fine, sprightly, and high flavor; Pinot de Pernaud—a fine type of claret wine, rather light in color and body, but with a sprightly acid and fine flavor; Petit Sirrah—deeper in color, more tannin, more body, though not so delicate as the foregoing, a very fine claret; St. Macaire—softer than the preceding, deep in color, strong in tannin, more resembling the Burgundies than the foregoing; Gros Mancin—very fine, deep in color, but delicate and sprightly, fine flavor, a true claret of the highest type; Tannat—very fine, much like the foregoing, abundance of tannin and color, sprightly and full; Cabernet Sauvignon—very delicate and sprightly, fine flavor, but with more tannin than expected in this variety, yet, on the whole, the best of a very superior exhibit of wines of a leading claret type.

Raisins.—We find the exhibits of raisins large and very choice, well put up and well cured generally. In the list we find those of R. J. Blee, packed by the Santa Ana Valley Fruit Company. London Layers, grown, cured, and packed by H. D. Halladay, also from Santa Ana, are choice. The Muscat of Alexandria raisins, from H. K. Snow, of Tustin, Santa Ana Valley, are very large and fine. Mr. Snow shows some seedless Sultana raisins, well grown and well cured; also, some London Layers of very superior quality. McPherson Bros., of Orange, Los Angeles County, exhibit a large collection of raisins, of first quality and in fine condition. D. W. P. Chubb, of Orange, shows a box of raisins dried on the ground, taken from the sweat box. While they retain the bloom of the grape, they appear as if dried rather than cured. We do not refer specially to some small lots of this fruit, of more or less merit. C. Z. Culver, of Orange, Santa Ana Valley, shows a small box package of very choice (London Layers) Muscat raisins, well cured, with the bloom perfect. The raisins are covered with tinfoil, and that is covered with oil paper, and would be an attractive package for the retail trade.

Figs.—The White Adriatic fig exhibited by Gustav Eisen, of Fresno, appears to be a very superior variety. The fruit is shown in its natural, unbleached condition. It is large and well cured and presents a very handsome appearance, being, in our judgment, equal, if not superior, to any fig ever imported into the State and supplies a long felt want.

Dried Fruits.—The exhibits of dried fruits are light. The sun-dried French prunes of H. Goepper, from Santa Ana, are very large, and under proper manipulation and packing would show well in any market. His apricots also appear to advantage. Mr. Goepper also exhibits a bottle of unfermented wine. It is clarified and shows well. Joel B. Parker, of Orange, shows evaporated apples and apricots, which we consider of best quality, though not possessing the best appearance alongside those packed for show.

Fruit Box.—There is also on exhibition a patent fruit box similar in construction to the common egg box used on the Pacific Coast, with the addition of paper sheets, perforated on the sides and top, so as to afford perfect ventilation. This box comes recommended by Parker Earle, President of the American Horticultural Society. It is manufactured by Jenkins, McGuire & Co., of Baltimore, Md.

English Walnuts, etc.—Of three exhibits of English walnuts, the two varieties shown by Ellwood Cooper, of Santa Barbara, are large, of good color, soft shell, plump, sweet kernel. The two samples of almonds of Mr. Cooper are also good. Of the two varieties of chestnuts exhibited by Mr. Cooper the American variety is very large and fine. The walnuts exhibited by George W. Ford, of Santa Ana, are of soft shell and very large. There are two samples of Italian chestnuts, which are not worthy of any special mention.

Olive Oil.—The exhibit of olive oil by Ellwood Cooper needs no commendation from us, it having already acquired an enviable reputation in all markets where it has been introduced. A branch of the olive in fruit is also exhibited by Mr. Cooper. We also report a jar of very large pickled Mission olives, put up in 1884, exhibited by P. Cazneau, of San Fernando.

Flowers.—The bouquets of roses and other flowers, from Mrs. Maggie C. Rice, of Highland Park, are choice and quite attractive; also, a basket of flowers exhibited by Mrs. Rosenbaum, of Pasadena.

Corn and Vegetables.—There is a fine exhibit of white corn in the ear, made by Mr. Doyle. Also a watermelon of very large size and excellent quality, probably weighing sixty-five pounds, exhibited by D. Edson Smith, of Santa Ana. Mr. Smith has a flat ribbed squash, of hard shell, marked ninety pounds; also shows another squash, of supposed mixed character, of much larger size, with shell not quite so hard. Of the special value of these squashes, the committee makes no further report. There are several very large mangelwurzel beets, exhibited by Mr. Smith; also two varieties of sweet potatoes—the White Brazilian and Red Bermuda—that are well grown; also, by Ellwood Cooper, a bunch of Yellow Nansamond sweet potatoes, very smooth and fine, illustrating the yield of that variety on the vine.

Orchard Whiffletree, etc.—A double and single whiffletree, with clevis and traces so attached as to be used in the orchard without injury to the trees, appears to be a good device, which bears patent date of 1883. There is also on exhibition a patent harness for use in the orchard, which does away with the whiffletree altogether. It consists of a steel yoke drawn up under the horses' body so as to closely connect the team, a broad band passing over the back to hold the yoke in its place. The contrivance is such, that the draft comes from a central point in the yoke. The horses are connected to the yoke by a short trace, and the claim is, that it can be used without injury to trees or vines.

Insecticides.—The exhibit of insecticides, by E. C. Niedt & Co., of Los Angeles, consisting of several kinds, is worthy of special notice.

Orchard Tools.—Dr. O. H. Congar, of Pasadena, exhibits his mortise and tenon grafting machine, which appears to be of practical value. W. B. Forsyth, of Orange, exhibits a pruning knife, the practical value of which is not known to the committee.

I. A. WILCOX,
A. T. HATCH,
GEORGE RICE,
Committee.

ADOPTION OF THE REPORTS.

On motion, it was ordered that these reports be received and placed on file, and made part of the proceedings of the convention.

Mr. Gray: I will be glad to say something in regard to the steel yoke here exhibited. I am not advertising any interest, still, I would like to have the fruit growers have the machinery that can be used to the best advantage. You can use those especially in the vineyards, and any one who has to cultivate cannot afford to be without them. We all know the difficulty of getting up close to the vines, after they have gotten about two feet growth, but with that arrangement you can cultivate or plow very close to your vines, and the horses do it with as great ease as they do in the old way, and the man with about one half the exertion outside of walking. I think that every one who has grapes to cultivate, or young trees, would find it to his advantage to procure one or more of these.

The Chair announced the topic for the afternoon:

PROTECTION TO FRUIT INDUSTRY.

Mr. Aiken: I do not consider this subject a political question; it is simply a policy for the fruit growers to carry up. I have very fixed, decided opinions on the subject of "protection." Protection has been the policy of the government of the United States from its conception; the first act of the first Congress in 1789, was an act imposing a tax on importations for the purposes of revenue, and the protection and encouragement of the manufacturing interests have continued until the war of 1812 necessitated a tax upon importation that was almost prohibitory, almost 100 cents on the dollar. That led to a great deal of trouble with our shipping interests in New England, but that tax was enforced by the aid of such eloquent advocates as John C. Calhoun, of South Carolina, and Henry Clay, of Kentucky, and was opposed by that eloquent statesman, Daniel Webster, of Massachusetts. However, there was in a few years a reduction in the tariff, until 1824, when there was a slight increase because Daniel Webster had from necessity been obliged to favor protection, as New England had become a manufacturing section of the country, and John C. Calhoun, finding that the Southern States would be necessarily producing States, and not manufacturing, turned in favor of free trade. This led to considerable discussion in this country, so that in 1832 there was a compromise by Henry Clay and Daniel Webster with Mr. Calhoun, and the tax was somewhat reduced, but the direct result of that reduction was a financial crisis in 1837, that for, we might say, the first time almost revolutionized the finances of the country. In 1842 there was a slight increase in the tax, and in 1846, under Mr. James K. Polk, at the commencement of the Mexican War, the tax on importations was further reduced in a manner looking to free trade. This continued for a series of years, until it lead, as we believe, to the great financial crisis again in the year 1857 that nearly bankrupted not only our Government, but nearly every individual living in the United States. That was followed up to 1861 with almost a failure of resources on the part of the United States, so that in 1860, just prior to the war, no money could be borrowed by the United States Government, but the necessities of war led to the imposition of a tax for revenue upon importation, and under that tax we live substantially to-day. So, when I assert that protection has been the policy of this country, I think history will bear me up, and when I assert, also, that the financial crises of this country have followed almost immediately, and as a natural consequence, upon the reduction in the tariff by the Government of the United States, I desire to leave that and point out, if possible, why it is policy for the producers of this country to seek protection. Our wool interests have stood in need, and have received the protection of this Government. Until within a few years there, of course, has been a great deal of prosperity growing out of the wool interests, but the reduction a few years since in the tariff upon wool has led to such an importation of Australian wool, also from other sections, especially South America, that it has almost made sheep raising for wool impossible; and my friend, the Hon. H. C. Wilson, of Red Bluff, although somewhat a free-trade man, would probably favor a tariff upon wool, so that his industry of raising sheep would be more profitable than it is.

The prune industry, to my mind, is one of the most important industries that we have. We send to Europe annually over $3,000,000 of our money to import the foreign prune. There is now, and has been for many years, levied upon the foreign prune a duty of 2 cents per pound ad valorem, which is not sufficient, owing to the cheap labor and the old orchards, and the methods of preparing that they have in Europe, as against our young and growing orchards, and our want of knowledge and skill in the preparation of fruit; and I believe further that if our Government could levy a tax of 3 cents per pound it would be no more than is fair and just to this great and growing enterprise. If we did receive $3,000,000 of American money in California, instead of sending it to Europe, and return to the East that value of fruit, how rich it would make our coast. We raise, to our mind, a better prune; we have a better climate; we can, in time, learn the methods and principles of preparing, grading, and packing those prunes, so that we can fill the needs of the eastern markets on the basis of the foreign fruits, but I submit that we should now have a protection of 3 cents a pound.

So far as the raisin is concerned, I believe that the raisin grower, owing to the fact that the cost of the raisin is substantially that of labor, which is expensive in this country, instead of 2 cents, should have double, at least 4 cents, protection. A few years since they had 2½ cents, but that was changed. That little half-cent did not materially injure the country, but was a serious blow to our raisin growers, and if California is ever to be a profitable raisin State, it should have a firm protection, in view of the difference in the cost of labor.

The production of olive oil is one that could be developed into a great interest, but it must have protection. I cannot understand why any person desires the direct and oppressive competition with the old world, as against the fruit industry on this coast. We have the best State in the Union, we have a climate and soil superior to any in the world, but, unfortunately, our people, though they are intelligent, industrious, and useful citizens, cannot live on 10 cents a day, and that is what foreign labor costs in those countries that we are brought directly in competition with.

Mr. Wilson: Let me interrupt you. If you had a world for a market, with free trade, don't you think it would be better for all the countries?

Mr. Aiken: If we had that, in a few years, allow me to state, that I think probably that China would supply the world with almost everything, and we would be reduced to the level of a Chinaman in this country. I must say that the policy of the strongest, the wealthiest, and the best nations in the world has been protection for their interests and for their people. England is a very marked example of the idea of free trade, but I can say now, that I think that the best minds in England, and their best people, are looking for the salvation of England through protection. Germany protects its interests; France protects its interests, and France is certainly a very rich and prosperous nation. The common people in England, the most of them, are in trouble, and very poor.

Mr. Wilson: It is the most prosperous nation on the globe.

Mr. Aiken: Yes; there is great financial force in England, but it is not with the common people. The common people of the French received after that great French revolution a little piece of land, maybe no larger than one to five acres, and they made themselves independent and rich through their industry, and the protection French law has thrown around it.

Mr. Wilson: Who pays the tariff? Isn't it the consumer, the poor man that does all the work, and earns all the money? He pays every dollar of it.

Mr. Aiken: I would answer that by saying that the man who takes a protected prune pays his portion of the tax, but the money, the three millions of money that is sent to these foreign nations, would be kept at home, and would be of more value to the people than the whole tax that they pay for the protection. It is the encouragement of the industry. Now, Mr. Wilson will admit that without protection the raisin industry or the prune industry could not flourish in this State, and we could not profitably make raisins.

I will make a motion that Congress be memorialized to fix a tariff upon foreign prunes of 3 cents a pound, and upon raisins of 4 cents a pound and a suitable tax upon olive oil, which latter is to my mind a very important industry, though still in its infancy, so that we can provide the world with an honest, fair, and unadulterated olive oil, which we are unable to get from Europe at any price. If that resolution be passed I believe that the Congress of the United States at the present time has a large majority in favor of protection and we can secure the desired result.

Mr. Shinn: I think this is entirely out of order as a general question of political economy. I think this convention should confine itself to the consideration simply of whether it is to the interest of the California fruit growers that there should be an additional tax upon prunes, raisins, and olive oil.

Mr. Wilson: There was an old neighbor of mine, by the name of Nesmith, said to me: Why not favor a protective tariff? You know you get a less price for your wool without it. I said that is just the difference between me and you. I am in the sheep business, and I continue it because I want no rights that I would not accord to my humblest neighbor; I want no rights legislated to me, because to legislate from one man's pocket into another's is wrong.

Mr. Hatch: I move that it is the sense of this convention that the various fruit industries of this State need a protective tariff. Seconded.

Mr. Webb: I move to amend that by substituting for the words "protective tariff," that our Senators and Representatives in Congress be requested and instructed to pass and procure such legislation as may advance the interests of the fruit growers and producers of California, and I will explain the reasons for so moving to amend. In the first place, there is certain other legislation which is proposed to be enacted that will be very injurious to the fruit interests of this State, especially the southern portion of it. If that Mexican "reciprocity treaty" is finally ratified and goes into effect, there will be an opposition to Southern California fruit, and you cannot tell where it will extend to; it is more formidable than you have any idea of. It is no use to ignore the fact that Mexico can produce a very fine orange. What does that "Mexican treaty" provide? It provides that in consideration of the privileges to the producers and manufacturers of coal, iron, steel, and petroleum, all of which is produced by the combined capital of corporations, to ship into that country all their products and their manufactured articles free of duty, and that in consideration of that great privilege that has been extended to that class of enterprises, that the United States will grant Mexico the privilege of sending into the United States limes, or lemons, or oranges, grapes, raisins, figs, or wine, in fact everything that is produced in the soil, which will come in direct competition with our products of the soil, which is produced by *individual capital and labor*, is necessary to cover the whole ground, which I believe the amendment offered by me will do.

Mr. Bettner: I will rise to second Colonel Webb's amendment. If Congress should give us a duty of 20 cents a pound on raisins, it would be of no use to us if they should then put the "Mexican treaty" into effect.

Mr. Hatch withdrew his motion in favor of the substitute, and Mr. Aiken withdrew his motion for a committee of three.

Dr. Congar: In view of the fact that we import two or three million boxes of raisins from the old country, whereas we only produce two or three hundred thousand boxes; while I am a protectionist, it seems to me very unjust to the forty-eight or fifty millions of people to oblige them to pay this extra tax, because we are not organized or old enough to do this work as cheaply as we ought; and while we can produce only two or three hundred thousand boxes, Congress will notice no such proposition. You can put it in gold letters that they will not adopt any such unjust measure. We have got to correct the method of producing these things. Generation after generation have come and gone in Europe before they got down to this methodical, mechanical, and close way of handling their fruits. They handle one or two acres, and here we are anxious to handle a thousand. We will fail, because we are undertaking to do too much.

Mr. Hatch: I would like to ask one question of Dr. Congar: How long does he suppose it would be, with a "protective tariff" of 4 cents a pound, before California could supply all these articles?

Dr. Congar: I will say this: The principle of government and the present sentiment of the people is against the protection of the rich or a monopoly, especially at the expense of the poverty-stricken portion of the country. On that grand principle, Congress will not do anything for us. I will not answer directly the gentleman's question, because it would require some considerable explanation, but I say on general principles, our Government would not listen to a proposition of that kind where millions are expecting these imported goods.

Mr. Aikin moved as an amendment that a committee of five be appointed by the Chair to report a memorial to Congress in favor of our fruit interests, such report to be made the next morning. Carried.

The Chair appointed Mr. W. H. Aiken, Dr. Congar, Dr. Chubb, Mr. Bettner, and W. H. Workman.

On motion of Mr. Hatch, it was resolved that the subject of "the cultivation and pruning of fruit trees" be discussed at the evening session.

PRUNING THE ORANGE.

Dr. Congar: I wish to say a few words before I have to go home, about the "pruning of the orange tree." I discovered something awhile ago which was new to me at the time: that the orange tree especially, and the lemon also, project their wood in the form of threes; that there are three branches that start off from a given point about the same time, and under favorable circumstances the tendency of the tree is to grow rapidly in a horizontal direction rather than to shoot up. I found that in pruning the tree in a careless way, or by a careless hand, that it would grow unevenly, first one side and then the other, and also, that on the northern side of the tree it grew much more rapidly than upon the southern exposure. That is another proposition which I might discuss, but I will drop that for the time being. I found also, that the fruit was on the lateral branches of this triple growth, it was on the outside sprigs. Not being familiar with the terms that are used by experts, I give it to you in my plain language. There is the center shoot, and then there will be three more start out, the center one continuing, and two laterals and so on, until you have to cut back very materially, in order to get into your tree and keep it uniform in shape. I therefore commence to cut away the central, the wood-growing stems, to prevent it becoming too large, and thereby I would preserve the fruit-growing limbs and keep my tree in a symmetrical form, and govern the growth by that system of pruning, whereas a hand not accustomed to that and not understanding it, would grow up a tree and cut it off where-ever he chose, or, where it was most convenient to get in to use his knife, and you will observe it would be at the expense of the fruit-producing branches if it was pruned in that way. So I find it is a very essential point for our orange growers to understand, and I think if they look at their trees a moment, they will find that I am substantially correct. They will find if there is any fruit, it will be on those laterals almost invariably, and the center, as I say, would be the wood-producing stem or limb. Now, the reason why the wood grows more rapidly on the northern exposure, to my mind, is in consequence of this shade. The heat of the sun in this portion of the State is so great, particularly upon the southern exposure, that the flow of the sap must necessarily be impeded, and the fruit upon the southern exposure smaller than it is on the northern exposure; hence the necessity of cutting more wood away upon the northern exposure than on the southern. Those things we cannot have disregarded by our hired help except at our expense.

ADDRESSES FOR THE NEXT CONVENTION.

On motion, it was resolved that the following gentlemen be requested to prepare papers to present to the next annual convention on the following subjects:

Dr. O. B. Congar, on the subject of the "Pruning of the Citrus Fruit;" Mr. J. Shinn, on the "Apple;" W. W. Smith, of Vacaville, on the "Peach;" F. C. DeLong, of Marin, on the "Foreign Shipment of Apples;" Mr. A. T.

Hatch, on the "Almond;" Mr. I. A. Wilcox, of Santa Clara, on the "Strawberry, and all Small Fruits, except the Currant;" Mr. Ellwood Cooper, on the "Olive, the Manufacture of Olive Oil, and the Walnut;" W. H. Aiken, of Santa Cruz Mountains, on the "French Prune;" James Bettner, of Riverside, on the "Production of the Orange, and the Various Kinds;" Robert McPherson, of McPherson Bros., on the "Raisin;" Prof. Husmann, of Napa, on the "Quince, and the Best Shipping Grapes;" G. N. Milco, of Stockton, on the "Cultivation and Preparation for Market of the Fig;" Mr. Charles W. Reed, of Sacramento, on the "Best Shipping Fruits, Aside from the Grape;" Mr. George M. Gray, of Chico, on the "Pear and the Cherry;" Dr. Kimball, of Alameda County, on the "Apricot;" W. M. Williams, of Fresno, on the "Nectarine;" H. P. Livermore, of San Francisco, on the "Market and Marketing for the Current Year;" A. F. Coronel, the Commissioner of the Los Angeles District, on the "White Scale, the *Icerya purchasi;*" Mr. A. B. Chapman, of San Gabriel, on the "Shipping of Lemons;" John Rock, of San José, on "Nursery Stock;" Dr. S. R. Chandler, of Yuba City, on the "Planting and Pruning of Deciduous Fruit Trees;" H. W. Meek, of San Lorenzo, on the "Plum;" Gen. John Bidwell, of Chico, on the "History of Fruit Culture in California;" Dr. H. W. Harkness, on "Fungoid Diseases;" Frank Kimball, on the "Pickling of Olives;" J. A. Day, of Ventura County, on the "Apricot and Drying of the Same, and Packing it for Market;" T. J. Swain, of San Diego, on the "Guava;" Hon. George Stoneman, on the "Pomegranate;" J. M. Hixson, on the "Pieplant and Early Shipping Vegetables."

Mr. I. A. Wilcox, of Santa Clara, offered the following resolution, which, on motion, was adopted:

WHEREAS, The reports of general produce markets sent out by the Associated Press are of great value to producers and to the general public; therefore, be it

Resolved, That the manager of the Associated Press be requested to give his attention to the gathering and transaction of such reports relating to the market for California green and dried fruits, and thus confer a great benefit upon the fruit industry and business interests generally.

The convention adjourned until evening, at the usual hour.

CULTIVATION AND PRUNING.

At the afternoon session on Friday the Chair announced the topic, "The Cultivation and Pruning, and the Time to Prune Fruit Trees."

MR. GAREY: I would like to make a few remarks in regard to the theories advanced by Dr. Congar to-day, as to the best method of pruning orange and lemon trees, the orange especially. The doctor's particular point in regard to pruning the orange tree was, that he had discovered that the twigs of the tree, or the limb, grow in triplets; that is, as the limb grows out there are three branches, one straight branch, and one on either side, and that he has found, by investigation, that the two side branches are the fruit-bearing branches, and that the leading branch is the wood branch. Now, I would like to know if any other orange grower knows anything about that. I have never noticed it, and I think that my experience in that matter would not bear out that theory. I believe that the leading limb is as liable to have fruit upon it as the side branches; however, I wouldn't be quite certain about it, for I have not noticed it very particularly. But I tell you where I believe that pruning would be bad if followed up systematically, as he suggests. If at the commencement of the bearing of the orange tree the process was commenced, and the plan carried out, your orange tree in a few years would amount practically almost to a hedge. It would present pretty much the same appearance that a cypress hedge has when pruned continuously, and would throw out small branches until it became almost compact. I have an idea that it would have a tendency to thicken up too much, and the main object in the pruning of the orange tree is to thin out the branches on the inside, in order to admit all the air and sunlight that is possible. You can't do it too much; the orange tree bears altogether on the outside of the tree. Whether they bear just on these side branches or not, I am not prepared to say, but it certainly is on the outside. When you walk under a tree you will see but very little fruit, but on the outside the tree will be a mass of fruit.

In the pruning of the orange tree, as I said in my essay, there are two systems followed in this country, one called lower pruning, and the other called higher pruning. Some allow their orange trees to grow from the ground, don't raise them at all, and scarcely ever thin them out; others raise them gradually, from year to year, until a horse can be driven under the limbs, in order to cultivate them close around the trunk, and I believe it is generally considered that that is the best, but there is a great diversity of opinion on this matter, and a great many ways of doing it. One thing is certain: we must prune our orange trees in such a manner that we can get at them pretty easily, and thin them out pretty well, because if they are not, when the black scale or other scales make their appearance, we cannot get rid of it at all. You must have it very open and thin, then if you wish to spray, it is an easy job to clean the tree easily, and the tree has a tendency to clean itself.

Dr. Lotspeitch: I can speak of the orange tree when I cannot speak of any other kind of trees. The best plan to make a tree, is to commence in the nursery. When the young tree is there it should be formed but a little at the lower portion. It forms in the shape of a tree after awhile, and when it is taken from the nursery it should be set out as well as you can possibly put it in the ground. My idea and practice has been this: to wet the ground thoroughly in the nursery, take the tree up when the ground is thoroughly soaked with water, that will give you a tap-root perhaps four or five feet long. Well, a man will say, I can't dig a hole four or five feet long to put the tap-root in, so cut it off. I say no; never cut it off. An orange tree two years old has good lateral roots also, and they can all be pulled out of this soft, muddy earth. To dig the hole so as to lay out all these roots would be an everlasting task, but you can take a crowbar and make a hole a few feet deep for the tap-root, and you can also make your holes on either side to receive those lateral roots. Put them in in that way, then set the tree, and cover it in with soil, and run water immediately around it. Cultivate it well for the first season, run the water very closely to it, then trim it, but very slightly, never cut back very much of the outside limbs. The second year you trim it a little higher, and, little by little, year after year, go up; never trim to a bushy top; leaving the lateral limbs touching the ground, almost, but always keep them just off the ground, so as to keep insects from crawling up on the branches. In the course of six or seven years, perhaps, you would have the trunk of the tree two feet or so, and the limbs would be eighteen inches, perhaps, from the ground. Never let an orange tree, or any other tree, grow too high, if you can prevent it without injuring the growth of the tree. Keep it pruned out carefully, the outside of the tree, and inside. Make your ditches so that you can run water within three feet of the tree, that is close enough to run water around an orange tree, and have your machinery so rigged that your horses can walk between the trees up here, and the furrow will be under the tree. By low training, you have your fruit so that you can stand on the ground and pick it all around, instead of having ladders twenty-five feet long, to go up on the tree, or have a distance of five or ten feet from the ground before you get an orange. That is my opinion; still, there may be better ways of cultivating a tree. But a tree that is not trimmed up to make a high tree, will make a heavier stock and a better bush than the tree that is trimmed up, and the fruit that is grown on it grows just as good and better than that which is grown on top, because the wind is not slashing it around, and scratching the oranges, and making them unfit for market. Those that are near the ground are as fine oranges as we ever find.

Mr. Garey: How do you cultivate the tree for the six or seven years?

Dr. Lotspeitch: We take a Buckeye sulky plow and we have a seven-foot cultivator, that we call a "tarantula cultivator," and we attach that to the Buckeye sulky and ride along and cultivate. You can go along on one side, cultivating clear up under the tree. You can run it right up against the tree, if you wish to run that close. That is the way we cultivate under the tree, and we have trees that are ten or fifteen feet across.

Mr. Garey: How do you get rid of the gophers?

Dr. Lotspeitch: You could not have found a gopher among our trees in two years.

Mr. Garey: How do you get to spray the tree under these circumstances?

Dr. Lotspeitch: I use a No. 1 Hooker pump and I have a four and a half foot lever on it, and fifty feet of hose, and I puncture a slit in the disk that I put on the San José sprayer. The hole I puncture is oblong, about the same as you could put the point of a pin in. Then we put two men in the wagon with a tank and they work the pump in the wagon. The pumpers will pump seven to eight hundred gallons of water through these two sprays in a day. I have on the end of our hose ten feet of one half inch iron pipe; the nozzle is on the end of and then we commence; and if we want to spray a tree of the kind you speak of we just get right down underneath, on our knees, and we go through the inside carefully and we take it all around, running it from one side to the other, and we pass up, out, and around that tree. I have the greasiest suit of clothes you ever saw in your life; that is what I wear when I spray, and I spray every year. I sprayed this year three times in parts of my orchard, and I have watched it and been with every tank that goes into the field. That is the way a man has to do if he sprays thoroughly, and that is the way I have sprayed our trees. It is a very nice job when it is well done.

Mr. Cooper: About how many gallons to the tree do you use?

Dr. Lotspeitch: I can answer that: a seven-year old orange that is grown well, of the Mediterranean Sweet variety, will take six and a half gallons to a tree; a seedling tree of the same age, well grown, takes fifteen gallons; you can take a Rio tree that is not quite so large, and it takes a little less.

Mr. Garey: How many of the Rio variety have you?

Dr. Lotspeitch: About five hundred Rios.

Mr. Garey: How do they differ from the Mediterranean Sweet?

Dr. Lotspeitch: Just about as a black oak tree would differ from a white oak tree. There is a very different appearance of the limbs; they grow out differently. The orange is very similar to the Mediterranean Sweet, but the difference is in the growth of the trees. They are more rapid growers; they are not bushy trees; they throw out young lateral limbs, and they will thrust out a sprout when they are growing, and from four to six right at the end of it. The Mediterranean Sweet will never do it—just like the seedling oranges.

Dr. Kimball: I hardly feel myself competent to say anything in regard to the orange question, but, at the same time, I ought to have an opinion about it. In 1871 I sent to the Islands and obtained several crates of oranges that were picked ripe, for purposes of getting the perfected seed in order to start an orange nursery in Alameda County. I had been previously down in this country two or three years before, and thought very favorably of orange culture. I raised trees from my seed and after they got to be about two feet high, I took them out of the ground and transplanted them, cutting off the tap-root, and set them out in nursery rows. When they were about four years old I budded quite a large number of them with the Acapulco, and some few with the Navel orange that I obtained from Washington, D. C., and when I got ready to transplant them, as they were quite large, vigorous trees, I had a ditch dug between every other row, and a spade run under each tree, cutting off the tap-root, and I ascertained from the way that they acted in the future, that it was an important thing to follow out the natural inclination of the tree. They were bound to have a tap-root, and where I cut the tap-root off, there immediately started down two or three more; they were bound to go down. In trimming them up, I have observed particularly what agrees with Dr. Congar's theory of the growth of the orange. I noticed that when I cut out the center branch, the effect is to stimulate the development of the fruit buds on the other branches, because to a certain extent it checks the growth of the tree; and I have been struck with the peculiar difference of the orange tree from any other tree in regard to this development, partly on one side and partly on the other. It has been one of the greatest studies that I have had, how to prune the orange tree, and I don't know that I have decided on a positive plan yet.

But, in regard to deciduous trees, to change the question, most all of our deciduous fruit trees put out a spring growth. We have two growths in Alameda County, the spring growth and the September growth. The first growth is the direct growth and central growth, and afterward the side growths come in, the lateral branches, and if you cut off the central branch then you abnormally develop the others, and it seems to me that nature's way is the best way, that it is the only true way that we should follow, and that is, to cut them all back when we trim, and leave the central one a little in advance of the others, to let every lateral branch of the tree, in a certain sense, be a main branch by itself. I do not wish to be misunderstood, because in every tree there is a main branch in the center, the standard, but there are always these other branches, and the proper way to trim, the way that suits me the best, and that I have the best success with in all the trees that I plant (and I cultivate almonds, apricots, peaches, pears, plums, and cherries), is to follow out that plan of nature's, and when you trim leave the central branch a little the longest. Don't cut it out, because nature is bound to go ahead, and instead of having one center branch, you have a bunch of laterals of which each one tries to be the center, and the result will be that your tree will be too bushy, too broomy. I do not put myself in the position of instructor about pruning or trimming, because I believe that the intelligent man is governed by the circumstances and conditions of trees that he is working up, and that he will vary according to the circumstances. I don't think there is any iron-clad law that can be laid down in trimming trees. I see the best results in growing all kinds of fruits by all classes of men by thinning out their trees, but I think, in the main, that nature's way is the true way, and that we should never cut out, never exterminate the center, but leave it a little in advance of the others, and cut back the center only in proportion as we cut back the laterals.

On motion, it was agreed that in the discussion on pruning and culture of trees there be considered, first, the apricot, second, the apple, third, the pear, fourth, the peach, fifth, prunes and plums; that in the discussion twenty minutes be devoted to each subject, and each speaker be limited to five minutes.

THE APRICOT.

J. B. **Parker**, of Orange: The apricot with us grows much as it does with you in the north, and from my experience, and what I have read and heard, I find that the tree has a tendency to branch out too much and I go and give it a summer pruning about the last of May, as a rule. I give it a fall pruning, also, and I cut back within ten inches of the old growth; that is, on the last ten inches of the new growth on each tree. The result was that I got my tree in a very compact head, and last fall I thinned it out thoroughly and my trees blossomed finely. I had a heavy crop for the age of the trees—that is, it would be so considered with us. I had about fifty tons on the orchard, and trees that were not pruned through the valley, a great many of them, did not begin to bear any such crop. Some did well where they were pruned once a year, but my observation goes to show that the summer pruning had a great tendency to make the fruit earlier, though it might have the effect to dwarf the tree in the future. If there is any one here who has had any experience of the bad effect of summer pruning I would be glad to hear from him.

Dr. Kimball: I have a small apricot orchard, some of it for perhaps twelve to fifteen years, and in a good year I have from one hundred to one hundred and forty tons. I think, in regard to pruning the apricot tree, the old saying will properly apply: "He who spares the rod spoils the child." I think it is necessary to use the knife freely on the apricot tree, first in getting it into proper shape, and you all know that it is a tree which is particularly inclined to overbear, the consequence of which is a large quantity of small, inferior fruit that you cannot sell to canners at all, and which takes a longer time to prepare for drying. In raising apricot trees, if you receive the trees from the nursery, yearlings or two years old, I think that they should be trimmed severely for about three years to place them in a condition so that they will not split down, for I believe that of all the trees that we rear in the central part of the State, and perhaps here, that the apricot is more inclined to split down and be broken by the wind, and be broken by its weight of fruit, than any other tree that we raise. I have had some trees that I think produce from seven hundred to one thousand one hundred pounds of apricots in a year, and they are not headed at all; or, I might say, headed in a group, two or three limbs divided right together. In first forming a tree, if you let three buds come out together and reach out in different ways, when the trees bear heavily they will split down. The tree should be shaped, if possible, so as to have one leader, one center, and they should be trimmed to come out, not at a point of junction, but two or three or four inches above or below, and you have a symmetrical tree, and without danger of breaking down in that way. As I have said before, it is necessary, in order to get the best results, to thin out thoroughly. I always leave these lateral branches from the central branch that forms the head of the tree, one coming out on the east, one on the west, one on the north, and one on the south; trim them similarly as you do the center, and you have then a symmetrical tree. Of course, the apricot tree should be severely cut, because if you let the tree fruit, and if you trim it too close, hedgelike form, you will have a large quantity of fruit of an inferior quality. But if you cut back to the three lateral branches, besides the main center, keep it thoroughly thinned out, and when you cut off the ends of the limbs of a year's growth do not let it be too broomy; by that way you save the process of going through your trees and thinning them so much, for in our section of the country we not only have to trim our trees sharply, but go through and pull off the fruit.

Mr. Milco: A friend of mine in Stanislaus County has a little orchard of five acres and about three years ago I was visiting him, and looking at his orange and almond trees. They had made a wonderful growth, great fine trees, but no fruit on them. He wanted to know how it was possible to make those trees bear. I asked him what he was doing to them, and he said he gave them all the water they needed. I told him to go to work and root prune them. About eight feet from the trees dig down all around and cut off all the roots and see what that would do. The result is that he is having the trees loaded down with bunches of beautiful looking oranges. I was over there about three months ago, and it was a delightful thing to see those trees bear. In my judgment the best time to root prune is during the rainy season, say in January or February. In pruning orange trees on our place, and we have something like ten acres of young trees, we find that when they are severely pruned there is much gum on them, and I believe that severe pruning has caused it. However, our trees are young and we cannot tell whether that is the cause or not.

A Delegate: I would ask Dr. Kimball if he believes in summer pruning of the apricot?

Dr. Kimball: If there is danger of the tree growing so fast as to grow very much out of shape, as apricots sometimes do, I would use the knife to put it in shape. The apricot is the most wonderful grower, I think, of any tree we have. If I find its limbs commence growing down instead of growing up, I would cut those off, but we do most of our pruning in winter.

Mr. Bettner: Summer pruning of the apricot is done very largely at Riverside. It is the universal practice there of all the apricot growers to cut back the trees in summer, directly after the crop is picked. Some also prune in winter additionally, but not all of them. The main pruning is done in the summer time, after the crop is gathered; that is the result of the experience there for a number of years.

Ira F. White, of Vacaville: The same custom is pursued in Vacaville. We deem it an advantage to the tree and to the fruit the next year to summer-prune.

Mr. Shinn: There is something more to be done in the way of pruning the apricot. It has such a tendency to split down the limbs. If you notice any young orchard of apricots, you will probably find that the first year they are planted out they do pretty well. The next year, if you let them alone, with no effort to check them much, they make a most tremendous growth, perhaps greater than any other tree we have. If they be planted just as you get them from the nursery, a considerable number of them will split to pieces and be greatly damaged. That could be avoided almost entirely by making a proper selection of the tree when you plant it. Do not buy trees that do not have single stems with strong, nearly horizontal laterals. If you do that you will have no trouble about it. I think the apricot should be pruned almost the same as any other tree the first year. It should be pruned with reference to its symmetrical and proper shape. When it comes to be a tree, if you find it is going to split, and you can find it out easily enough by the looks of the tree where the crotches are pointed, cut off one limb or cut it back. I never summer prune apricots, except for the purpose of avoiding that splitting. They will bear enough without summer pruning in all cases I know anything about.

J. Begg: I have understood from remarks made here that pruning is a haphazard business. It is nothing of the kind; it is thoroughly a scientific business, and there is a proper way to prune every variety of fruit. I will say in reference to the apricot, that the gentlemen are all right and all wrong. It is right to prune the apricot in summer to a small extent, but then again, if you prune it severely and prune the larger limbs, it is necessary to defer the pruning until winter, and then you thin out the bigger limbs of the apricot. That is the proper and judicious way to prune the apricot. The apricot is generally allowed to have the branches too thick; it is the universal fault in California, not only with the apricot, but every variety of deciduous trees; they leave two thirds too many branches on the trees. The suggestion I would give, as how to prune the apricot, would be to head it back in summer and then prune out the bigger branches in winter.

Mr. Wilcox: So far as pruning the apricot, my general rule is like this: If the tree has made a very vigorous growth, I would cut it off any time in the year; but if it has made a short growth I would not check its growth; I would leave that to winter. This rule applies to all pruning, so far as I know.

I. H. Thomas: To prevent splitting, I bore a hole and put a bolt in and screw it up tight. It will do you no injury, that is, after I have got a large tree.

Mr. Garey: Down here, from our experience with apricots, the trees have a tendency to be shy bearers; they are shy bearers as a rule. Some varieties like the Moorpark, it is almost impossible to get to bear under any circumstances. It is unlike some other varieties, which are pretty fair bearers if we prune them in summer. I see by the remarks here that the tendency of the apricot at the north is to overbear; that is not the case with us; the trouble is to get them to bear. We have to aid them by summer pruning.

Mr. Begg: I do not think it is a good idea to put the summer pruning off too late. I notice in Fresno County some have put off the apricot pruning too late. They have a system of summer pruning by heading it off a little, and the trees make a growth of two or three inches between that and fall, and some of them being tender, the first frost coming in the fall nips them. I think if summer pruning is practiced, it should be done early, about the time you take the fruit off. If the tree is not in fruitage whenever you have got a growth of eighteen inches in the spring of the year, then summer prune, because if you wait until the next year, you will do that anyhow, and then you will advance the tree very near a year on the young tree before it commences to bear.

Mr. Wilcox: Summer pruning, or anything that checks the flow of sap, tends to produce fruit, whether it is root pruning or tying the limbs down, or summer pruning; and no tree will fruit when it is growing very vigorously.

THE APPLE.

W. H. Aiken: I am a little interested in this subject, still, I don't know much about it, although I have made a study of it for about ten years. In the first place, I don't believe in this high trimming of an apple tree. I believe in low trimming for the purpose of protecting the bark from the sun, and for the purpose of being able to get at your trees to prune and to pick your fruit. It will make a handsomer tree; it will bear more fruit and will be healthier, because the lower limbs throw a good deal of sap, and I notice the apples on the lower limbs are large and fine. I know in a block of Yellow Newtown Pippin trees, I put them out and cut them back pretty low, and they came out well, and are very handsome three-year old trees now. I built them out with limbs on each side, pruned them back next year so as to strengthen the limbs, strengthen the elbow, and endeavor to get limbs enough on to make a good tree. The Newtown Pippin has a small leaf. We have to put a good many limbs into it, for the reason that it is a very upright grower and has to have the leaves to shade its fruit, and we find that although it may appear too thick, when it bears it opens up and makes a very healthy, prosperous tree. It has bearing strength; the limbs do not come down; they have been pruned back so that they have grown large and strong from the limb, or the elbow, and hold the fruit up. I have tried the method of allowing the tree to grow without any pruning at all. With the Newtown Pippin it is fatal, for the reason the tree will throw up one, two, or three limbs, and they will keep growing up in the air without lateral branches, and the apples will be burned by the sun, and I have never been able in that way to raise apples of good form, size, or color. Some other apples, like the Baldwin, are very strong, healthy, large growing trees, and that, of course, needs some pruning, although not so much as the Newtown Pippin. It is a very good tree, and the apple is a very good apple. The Pearmain apple that I have noticed here, I have no doubt must grow on strong, well formed trees, for the reason that one of these Pearmain apples on the far end of a long limb would break it. The great point in apple raising is to make a strong, well developed tree with bearing strength and bearing space, and then thin the apples so that they will grow in marketable form, size, and color. I don't think that some of those large apples that you have here are exactly marketable. If many of them were one half as large, they would undoubtedly bring more money. It is not necessary to raise abnormally large fruit; the main object is to raise an ordinary fair sized lot of fruit. That is my opinion in regard to apples, and there is no difficulty in doing it, because if they tend to grow too large, you can allow more to grow upon the tree and they will come down in size.

MR. WILCOX: The Yellow Newtown Pippin has about three branches that grow very near together when they start, and in order to make a good tree after they get up aways, you must prune off the buds that start out all around all the time, for they encroach upon each other. That rule does not apply to all apples. The White Winter Pearmain I never prune at all. If you let it run it has a healthy body, and if you cut off the ends of the limbs you lose the fruit. The Baldwin don't need much trimming with me, and yet with some soils they grow heavier than they do in others. The Northern Spy, which was a great favorite apple in New York, became a favorite of mine, and I planted a great many a number of years ago, before we had the railroad, and I became disgusted with the fruit business and cut them down and put out small fruit. I am turning around now and planting trees. I believe that no general fixed rule can be given, but the man who is observing and looks at his tree and its buds will find what it needs to secure the best results.

MR. BERRY: I will state that very few people in this country prune the Pearmain at all; they let it grow.

A DELEGATE: Do you prune any of your apple trees?

Mr. Berry: Not very much; but I know the Pearmains are not pruned unless a sucker grows up. They may be taken off, but many growers do not even do that.

Mr. Bettner: It won't do to cut the trees off. If you do you won't get any tree at all. Some strong varieties may be improved by cutting them back; others it would not do at all. This is especially the case in the interior valleys, where it is warmer than on the coast. The result of it is, if you winter prune trees the sap seems to be checked, and that limb amounts to nothing. On my own place I simply practice thinning out. If the tree grows too bushy and throws too much shade, I simply thin out. I do not cut back the apple at all.

Mr. Wilcox: An apple tree, like any other tree, has the body above ground, and corresponding with that below, and, like any other tree, if it strikes hardpan it don't throw out much top, and does not need much pruning. As a general rule, that tree that grows very full will grow deep.

Mr. Stone, of Compton: I have had some little experience in farming here. I took the trees when they were two years old and set them out and trimmed the trunk up about four and one half feet high, and then the next year, when the limbs grew out, I cut them back, so as to cause the big, stout limbs to form the top, and the inside was pretty well cleaned out. In that way I have got trees reaching out in this way [showing], and I can drive a small horse below the tree to cultivate, and cultivate right up, with a "V" harrow, if necessary. This is the kind of fruit I grow [showing a very large apple]. It is not like that on all the trees, but it is on those trees that have not been bearing much. I have not cut the tops off very much after they got to be three years old, after they were set out, which, with two years in the nursery, make them five-year old trees. By that time I have got the tree in shape, but as they are now I have had on some of those trees perhaps fifteen props to hold up the fruit. I grow apples, such as that, on trees perhaps twenty-five feet high—as pretty shaped trees as can possibly be seen.

Mr. Milton Thomas: I wish to say, in reply to Mr. Aiken, that around Los Angeles we prune our apple trees regularly and systematically. I have had some experience, and claim to have planted more apple trees than any man in Southern California, and have raised as many apples and had a wider experience; and I say that we prune regularly and prune systematically, so much so that in my orchard we have many loads of brush to haul every year or two. I do not see how a man can raise apples without pruning his trees systematically and pruning them vigorously. Of course, the White Winter Pearmain is the best apple that we raise here. We do not prune it as much as other trees, because it does not require it. The fruit usually is borne close to the limbs and branches of the tree, and not on the ends of the limbs, as in some other varieties. In planting out an orchard I plant out one-year old trees—five or six feet high, say, when I plant them—and cut them off to, say four or three and one half feet, and then I allow a head to commence, and rub off all the branches that come out below two feet. Then I have those lateral branches extending out—just as many as I want—and there will not be those crotches or forks. There will be lateral branches, and there is not much danger of those breaking. The next year I prune back some of those branches—all of them some—and every year, till they get to bearing, prune some off, so that I have a branch large enough and stocky enough to bear fruit. I think we should prune apples; and I know around Los Angeles there are hundreds—I might almost say thousands—of loads hauled off our orchards and given to Chinamen for fuel, or burned up.

Mr. Begg: Are any of the apple orchards in the southern part of the State affected in this way: eighteen or twenty inches of the ends of the limbs refusing to leaf out with perfect leaves, and the following season the limb dies down to where the healthy limb would put out? We have that disease in some orchards through the valley. The limbs have been placed under a strong magnifying glass; there is no insect on them. For eighteen or twenty inches on the top of the tree it will be, probably, a half-sized leaf during the season, and the following season it will die back about eighteen inches, and at the point where it dies a healthy sprout will start out and grow up and make a terminal leaf.

A Delegate: I believe that is owing to the soil. Here in this portion of Los Angeles County some are troubled very much with alkali, and sometimes the trees will grow that way—that is the only way I can account for it.

Mr. Gray: At Chico we are troubled something that way, with the limbs not coming out fully. I noticed especially a young orchard three years old. Last summer there was a few scattering trees that sometimes would have the whole top of the tree affected, and other times on one side the leaves would be full sized, good, strong, healthy leaves, and the other half of the tree about half size, and I know it will die next year. I thought it was probably alkali; that was my opinion of it, but I examined very closely, thinking it might be some insect at work, either on the limb or on the tree, but I could not find it there.

Mr. Begg: I experimented on one tree. There was no alkali soil where it was. It was a White Winter Pearmain. I cut it down to a bare pole, thinking I could overcome it. That tree made a growth of six or eight feet that season. The next season the same thing occurred in the top of the tree, and I finally dug the tree up. Strong pruning did it no good.

THE PEAR.

Mr. Thomas: My trees, perhaps, differ from any other, but our treatment is about the same as with the apple. Our year-old trees are usually four to six feet high. We plant them, and we cut off the top and leave only, say, two feet in height, and then you can have six, or eight, or ten branches come out. The next year you should cut back two thirds, particularly if they are Bartlett pears. If you don't prune systematically and thoroughly, and prune every year, the trees overbear and ruin themselves. My idea is to prune back every year, and make your trees and branches stocky, so that they may be enabled to bear the fruit when they come into bearing. They commence bearing usually about the fourth year, sometimes the third year. To have our pear trees so that they will bear a full crop, prune them back, and make the branches and trees stocky, so that there will be no question about their being able to bear the fruit and not break all to pieces, as I have seen the Bartlett pear, particularly.

A Delegate: Do you cut the limbs, or cut the ends off?

Mr. Wilcox: The Bartlett pears on the ends. I cut them as I do a Newtown Pippin—I cut them with the idea of getting the head, until I get them started up. The more tops you can get, the more fruit you will get. For the first few years you throw the strength into the tree, you lose no fruit, and lose nothing except in the time in which it gets to bearing. That is my experience with that fruit.

Mr. Shinn: I think that the general principles of pruning apply to almost all fruits—certainly to the apple, pear, and plum—and I think Mr. Thomas has very correctly stated the general plan which should be followed when trees are planted out. The main object, as I said before, with young trees, is to so trim as to make a well shaped head; do not prune with reference to fruit until they begin to bear freely. I always tell everybody to leave the strongest bud on the wind side, and the strongest root you will have will be on the wind side. Rub off all you don't want. If you want four, have four; if two is enough, let them grow—let them grow a year. I certainly never practiced summer pruning in trees of that class, but do not let more branches grow than you care about having, considering what will be the future of the tree. Next year cut back. There are various views about that, but I should cut back within ten or eleven inches. When they start out on each branch, they will start out two shoots. You may wait until they have started and do the same thing; rub off as many as you do not want, still referring to the kind of tree you want, and remembering also, that you must manage a tree according to its character. If it is a Rhode Island Greening apple tree, you need not be very much disturbed about its running up out of reach, and you must prune with reference to that; you must understand the character of the trees, and prune so as to throw the branches upwards. But, suppose it is a Bartlett pear, then you go on a totally different method. The object, as Mr. Wilcox suggests, is to spread it. If you don't, it will run up so narrow that it won't have much value to it. You must leave the buds on—on the outside—then you must force it so as to throw out more branches, and in that way you will keep on, say for about three years. If you keep pruning the tree upon that plan, you will have a nice big tree. It is troublesome to get a fine head on the Winter Nelis, but if you don't prune too much as you do the others, the tree will straighten itself up and finally be a pretty good shaped tree.

MR. STRONG: I have been told that the Winter Nelis tree requires heavy pruning to make it bear. Now, I have got a number of Winter Nelis trees, eight years old, perhaps, but not large trees. There are some of them probably twenty feet high, and they have not borne much yet; probably the most any of them have borne this year, has been an average of a box and a half to the tree. They are covered with blossoms, but I don't get the fruit. I have been trimming very much. Two years ago I cut six to eight feet from the tops of them, but in place of getting less growth, I think in one year it was bigger than it was before. I don't know what to do with it; some people say you have got to let them alone until they get through growing and then they will bear. Those trees have been growing from four to six feet on top, getting way up. As I said the year I cut them most, they grew more than they did any year before, but this year they have stopped growing those big growths, and have put out a lot of little ends which grew out about six inches. Some say that is an indication that next year they will bear; I do not know anything about it; perhaps some of these gentlemen who are posted in raising Winter Nelis can inform me about it.

MR. BERRY: I would like to ask any gentleman here from Southern California, whether they have had a crop of pears?

MR. BETTNER: I have pears bearing splendidly.

MR. BERRY: Down where I live, in the further part of the county, it is impossible to grow a crop at all. For three years we put out pear trees; they have budded out and that is all they have done since. So far as the pear crop is concerned, I doubt very much whether Los Angeles County will ever be able to touch the other part of the State. I have never found anybody in our section of the country who grows pears at all, and we began digging them all up.

A **Delegate**: Is your soil strongly impregnated with alkali? I saw a tree the other day that was nearly dead; it was attributed to that.

Mr. Berry: There is a gentleman living two miles from me whose trees grow very vigorously, but do not bear any fruit. I do not know whether he had any alkali in his land or not.

Mr. Bettner: I can say that my soil, where I have my pears, is low, sandy loam, and they do not bear so well on the heavier soil. I don't think they bear so well on the wet soil in our locality. The Winter Nelis with me grows very strongly. They do not make a robust, thick limb, or thick sprout, but they send out very long, willowy sprouts, and a great many of them, and they need shortening back very much, and pruning, as suggested by Mr. Shinn. I have pruned my trees very systematically in that way, and I have very good, sightly trees, and they bear as fully of fruit as they well can. Half a mile away the trees will not bear nearly so well. Perhaps it is on different soil.

Mr. Wilcox: So far as the Winter Nelis is cencerned, I have a tree sixteen or seventeen years old. It bears pears about as large as you see on exhibition here, but I never raised over a box and a half. When I began at my place I thought I would plant Winter Nelis. It is the best pear we have when it is successful, but it is a very delicate pear. The blossoms are so tender that the least storm in the spring or cold will destroy them. My trees were all full of blossoms last year and the year before, but after finding their character out and the experience of others with them, I shall cut the trees down and graft them over. We have large orchards of Winter Nelis, and we have all come to the same conclusion. Mr. Block, one of the largest shippers, has cut his off and put in some other kind. Where the Winter Nelis does well is where the roots don't grow too deep, and where you do not get too much top. The Easter Beurre grows in naturally damp, cold soil. The Winter Nelis does not owe its want of bearing to the alkali in the soil, because this complaint is so general. Sometimes there are peculiar local conditions. Where we have a gorge in the mountains through which the air sweeps down you find all kinds of fruit suffer, and these local conditions, these atmospheric conditions, are probably the cause of this trouble.

Mr. Gray, of Chico: There is no fruit that will bring in as much money to the northern part of the State, particularly about Chico, as the Winter Nelis pear. That has been my experience for the last few years. We sell all we have from 2 to 4 cents a pound, and could sell more, too. We do not have them as those exhibited here, and do not want them as large; but we have a nice shipping pear for the retail trade. They are probably about two or two and one half inches through. We have to prune them there a little different from here or the Santa Cruz Mountains. We have to prune with an idea of making all the shade for each tree that we can, on account of the very hot summer. The Winter Nelis gives us a good crop every year, right straight along. We have never had a failure since I have been there, and it seems to be a very profitable tree, yielding from four to seven or eight hundred dollars an acre.

Mr. Stone: This gentleman on my left seemed to leave the impression that we could not raise pears. I want to take that cloud off his mind if possible. I raise a few Bartlett pears myself, and I think I never saw a tree in my life that bears as heavily as the Bartlett pear does, in this section at least, in Compton. My Bartlett pear trees are eight years old, and I sell the fruit off the tree by the pound, and they averaged me this year $6 to the tree.

Mr. I. H. Thomas, of Visalia: My experience of pruning Bartlett pears would be to endeavor to cut back the lateral limbs and increase the head of the tree by heading back. With the Winter Nelis I would leave the lateral limbs. I never cut that back at all after the second year; let it alone, it goes ahead and shapes itself. The only reason you cut out limbs is that they may be chafing one another. My Winter Nelis, five years old, yielded me six boxes to the tree. They are not large pears but medium size, and the trees have been bearing well since they were three years old. I do not cut out unless they begin to cross limbs and are chafing.

Mr. Wilcox: I know Winter Nelis trees that are as high as this room and have never been pruned; they are apt to grow right up. There is one point not touched here, and that is distance apart in planting. Mr. Block, at Santa Clara, got his trees so near that the tops run all in together; it looks like a labyrinth, and his orchard is one continuous mass of fruit on top, and it is a difficult matter to drive under the trees. Some of them are ten to fifteen feet apart—an old orchard, too.

Mr. Begg: Having once been in charge of a very large pear orchard on the Sacramento River, I have had considerable experience in pruning the pear, and I will say in reference to the Bartlett pear that the tendency of the branches of the Bartlett pear is to go up straight, and I am going to tell you this about pears, gentlemen, and I am making a pretty broad assertion, that there is not a pear tree in California to-day but is allowed to bear too many branches altogether. The Bartlett pear grows quite differently from the Winter Nelis. It grows into a dense, close head; about two thirds of the wood of the Bartlett pear ought to be cut out. The natural habit of the pear tree is to grow with a central branch, and all pear trees ought to be pruned in that direction, and it is a thing that ought to be kept in mind always, to thin out the pear tree.

THE PEACH.

Mr. Gray: I suppose you all think the peach tree is so easily raised that there is nothing to be said about it. I think that part of the Sacramento Valley around Chico is as good a peach country as there is under the sun. I presume that there are other places that other gentlemen would think to be better, but we have some very fine samples of peaches there. In regard to pruning the peach tree, I will give my method, and if there is a better way I would like to know it. In setting out trees I cut them off two feet high, and trim off everything on the side. The second year, I leave them from four to six lateral branches and cut them back to six inches long. The next year I leave two shoots to each, and cut them back to about twelve or fourteen inches. After that I cut off one third of each year's growth, thinning out, of course, leaving the necessary amount. We have one peach orchard, which will be four years old the coming January, and this last summer we picked something over two hundred and twenty-five tons off twenty-four acres. Mr. Jessup went through the orchard just before he started to New Orleans, and he declared that there was not a better orchard in the State that had never been irrigated—it has not had a drop of irrigation. At his request I measured some of the trees before he went away, and they were from four and a half to five inches through the butt, and from sixteen to eighteen feet through the tops, and if any one can turn out a better peach story than that, all right.

Mr. I. H. Thomas: Speaking of growing stone fruits, I do not believe there is anybody in this State grows better fruit than I do. I start them in the nursery and let them get eighteen inches high, and then stop that upper growth and bring out the lateral, and at a year old I have got a two-year old top on the tree. I let them grow and make a growth of eight or ten feet. Then I set them in orchard, cutting them back. I watch them, and in June I pinch back again, after they have made a growth of eighteen inches, and then I let them run the rest of the season. In the winter I cut them back to about eighteen inches of where I cut in June, and so on for about two years' growth, and then I increase my growth by spreading it, by pinching it from where I cut in the fall. After they get about four years old I cut back to within eighteen inches of where I cut it the last time. After that I let it take pretty much its own will; it will regulate its own growth. After it gets four or five years old it does not make the vigorous growth it does from one to four years old; then I thin it out, and consequently have large peaches.

Mr. Shinn: That is very much the same as suggested by the other gentleman; the only thing is he gains apparently one year by cutting back the nursery trees. Are your customers willing to buy that kind of tree?

Mr. Thomas: They are not willing to pay the freight on that kind of tree; consequently I pay the freight on it myself, in order to give them a better tree. The trees are very bulky. I have limbs on them as big as yearlings, and couldn't get over two thousand five hundred in a car after they are baled, and I have to cut the ends of them off in order to get them in the car.

Mr. Wilcox: I had the pleasure of seeing some of Mr. Thomas' trees in New Orleans; I saw some fruit also at the State Fair before we went to New Orleans, and I believe he had the nicest peaches in Sacramento at that time—the nicest display. But one thing I would like to ask: When a tree gets ten or twelve years old whether there will be any vitality in it if grown upon the system described?

Mr. Thomas: I know bearing trees near Visalia that are thirty years old; that is, they were bearing trees when I came there in 1858. One season they will make a big year's growth, and in the following season that growth will bear fruit in peaches; but they are liable when you cut back that way to get a dead streak on the southwest side of the tree that will get full of borers. They talk about a peach root not being long lived. You take an old peach tree twenty years old and break it down and it will sprout right up from the ground, and will have a healthy bearing tree. The roots don't seem to be affected; it is the body above the ground.

CURLED LEAF.

Mr. Clark, of Santa Barbara: I have got trees that have been bearing, but the curled leaf came on and injured them so that I did not get any fruit. I would like to hear something about that.

Mr. Shinn: You must do one of two things—you must let the fresh sprouts grow up before the first of July, and bud to something else that does not curl, or else dig up the tree entirely.

Mr. I. H. Thomas: We did not have much curled leaf in the San Joaquin Valley this season. A year ago we had it much worse than ever before. We never had it amount to an injury before. My opinion of the curled leaf is that the cause is atmospheric. It is true some varieties did not curl last season, but my opinion is, it is atmospheric. I take my orchard, for instance; the ground is certainly as wet this season as last season, when it curled so badly; in fact, I think the land, if anything, is a little wetter, but the season it curled so badly we had late rains that came on just as the trees were blooming, and we had excessive moist atmosphere for about two weeks; that is all we know about the curled leaf. Although the land below was a little wetter than the year before, I think it was the excessive moisture in the atmosphere, when the tree is blooming and the leaves coming out, that produced it. The roots are the life of the tree; if the roots keep sound, what is the matter with the top?

Mr. Begg: I happened to be at Salt Lake about two years ago. They were very much troubled with the curled leaf there, and they discovered a remedy for the curled leaf; whether it will apply to California or not, I couldn't say, but it is worth trying, at least. There they dig the soil from the roots of the tree, and then take a knife and score right up into the branches. They say it retards the flow of the sap, so that the curled leaf don't take any hold of the tree, and as soon as they begin to find that the tree is commencing to curl, they do that and they say it stops it at once. I wish some of you who have peaches would try that and report to this convention next year what your success is.

A few words in reference to pruning the peach. There is no fruit that you can improve so much as the peach by pruning. I will take a seedling. A gentleman at Riverside had a lot of seedling peaches that he was going to throw away, and said the peaches were no good whatever, and he wanted to root them up. I told him to wait and let me have a chance at them for one season; I pruned the peach, thinned the branches out thoroughly, and what was the result? At Colton there is a cannery and they make grades of prices: one half cent for seedlings, one for mediums, and one and one half cents for the best. My employer got one and one half cents a pound for all the peaches that I pruned for him; that is one evidence, and I think I can safely say that I can go through a peach orchard and double the size of the peaches by scientific pruning.

A Delegate: What time of the year do you prune?

Mr. Begg: In the winter. The winter is the proper time to prune the peach. Thin out the branches; thin out the small branches. Have them always equidistant apart; a good distance. It will close up before the summer is out, and then you will have fine peaches, and you will have to go around the tree and thin out one half the fruit; and that is the way you treat peaches.

Mr. Wilcox: I would like to say, in support of the idea I advanced, that I think Mr. Thomas' place is an exceptional one. I do not know of an orchard in this State that has been planted twenty years and not pruned that the trees are in good condition. I don't believe there is a healthy tree in the State twenty-five years old that has not been pruned; but where Mr. Thomas is he has a peculiar kind of a soil that is naturally loose enough so that the water don't stand on it. It is a very favored locality where a man can keep a tree alive all the time and not prune it.

Mr. Thomas: I can state there is a sedimentary deposit there in an old channel, and there is water in the channel. My young orchard is about seven years of age. To grow that orchard to be twenty years old I would certainly go to work to head them in and keep that in growth; but I do not cut back so severely after my orchard is four or five years old as I do until I get it up to that point, but I cut it back some.

THE PRUNE.

Mr. Aiken: To the discussion of the prune and plum, of course, the same theory will apply. I have not much to say in relation to it. The prune and the plum ought to be a vigorous, healthy growing tree, and in places where it is in a poor, rather light, dry soil, of course, it will make the growth lighter; and, of course, it would not need the amount of pruning back that it would in a strong soil to raise a good fruit. My opinion is that where a good apple or pear would grow a good prune can be raised. We must try and raise large, well developed prunes, since we find where there is very little growth of wood the soil is not very good, the prunes are very small and have no great value for drying. My idea of pruning the prune or the plum tree is to make a handsome tree with plenty of limbs, and prune it back so that it will give the limbs great strength and bearing space. In that way you can raise a large amount of good plums or prunes.

A Delegate: Do you thin out much?

Mr. Aiken: Not very much, unless the limbs cross, because when they begin to bear the tree opens very nicely. I have eight-year old French prune trees, and, though they didn't average it, many of them had eight hundred pounds of French prunes on this year without much affecting the form or the shape of the tree. They were so pruned and so strong, and with such a broad bearing space that they bore that amount of prunes, and very easily, although it has been a dry year, and they were not quite as large as they would have been if there had been a little more moisture. I think the great mistake in raising the plum and the prune is to leave too few limbs, say one limb way up in the air and the other one in another direction like two arms. On such a tree you can raise very little fruit, and it would be of very little profit. I am of the opinion, too, that this pruning should go on each year and give a fine form and strength and bearing space, and when the tree bears and gets to be over six years old and is in good bearing you don't need so much pruning back. Indeed, I think when it is eight, or nine, or ten years old I don't think it needs much, if any, pruning back; of course, take out the old limbs to keep it in good form or shape. If that is not a good way to prune the plum I would like to know it.

A Delegate: What is the character of the soil?

Mr. Aiken: These prunes that bore so heavily were on dark, rich loam—you might call it a sandy loam, and the clear soil under those trees is, according to my measurement, about twenty-five feet in depth. It is a very rich soil, and we have from sixty to eighty inches of rainfall in winter.

A Delegate: Is the French prune a regular bearer?

Mr. Aiken: Never fails; that is a remarkable feature of the production. It will bear a good crop each year without any failure from any cause I ever heard.

A Delegate: I heard one gentleman say that they were bearers only once in two years.

Mr. Aiken: That is hardly so in our central part of the State, and another thing, the French prune especially needs rather a long season, a cold season. I don't think it would be profitable to raise prunes in this section, or in the hot valleys. A few have tried it, and I do not think they have made a success of it for many reasons; on account of the heat and the drying up they do not mature in size, or form, or taste.

A Delegate: Do you irrigate?

Mr. Aiken: No, not at all. We try and cultivate well. With me there is a very thick clover and alfilerilla grows in the orchard during the winter, and I turn it under each year for manure for the trees. The soil is very rich, but I have done that plowing under regularly, while a neighbor of mine never allows a spear of grass to grow, and I believed he starved his trees out. I believe you can starve trees as well as anything else.

Mr. I. H. Thomas: I have been observing the growth of the prune in the San Joaquin Valley, because the question is asked us as nurserymen what to plant. In Fresno, in the Central Colony, the oldest trees I know of growing there are about seven years old. The land is laid off in checks, one check in French prunes, and so on. They have adopted the system each year of pruning in close, and got but very few prunes; then the next block of trees is not pruned at all, except to cut out cross limbs, and a heavy crop is the result. That has been my observation in watching that orchard for three years, and from that observation I do not believe I would do much pruning of the French prune after you get it in shape as a three-year old.

Mr. Aiken: Don't the prunes there burn? Is it not too warm for the prune?

Mr. Thomas: No.

Mr. Aiken: I was going to ask if you have any experience in this part of the State with the prune, the French, the German, or the Hungarian?

Mr. Milton Thomas: I will say that the French prune, in Los Angeles County, generally does well, more especially in the Santa Ana Valley. I heard Mr. Center, a very reliable gentleman, say that parties there with six-year old trees had six and eight hundred pounds on their trees for a number of years; they seldom fail. As to plums, there are very few varieties of plums that do well in Los Angeles County to my knowledge, and I do not recommend anybody to plant a plum tree here, but a French prune does well, so far as I know.

Mr. Wilcox: Perhaps the largest prune orchards in America are in the Santa Clara Valley. We have them there to the extent of one hundred acres in an orchard; one person has more than that. Those orchards have sold for large figures, some of them, but they are planting so extensively that some are almost afraid to plant them. You will see that of the French prunes there are several types that do not always appear the same. These prunes exhibited here are an odd type of prune; if they had been well handled and put up they would have compared well with any in the market. There is this about prunes—when they bear too heavily on dry ground they will be small. Mr. Aiken said, at the last meeting of the State Horticultural Society, two or three weeks ago, that it is his impression, from what he knows of the Chicago market, that you must depend hereafter on the size of the prune more than anything else. There is a kind called the "Robe de Sergent." I believe that is the name. That prune is said to be very much larger. I shall plant some of them the coming winter. I intend to plant a great many prunes. I have faith to believe that I can raise them, although it may be that we will need a higher tariff to make them profitable; still it pays very well, and the amount used in the United States at the present time is enormous, and I think we will use more. It is the cheapest fruit we can use, and very healthy. I think the day will come when we will supply the consumers in the East. I would encourage every man to put in more prunes where they do well.

A Delegate: Do you raise the French prune from the cutting?

Mr. Wilcox: We do not, but we graft it on another kind of cutting. Whenever the soil is very rich, suckers will come up; now, if you expect to raise a good tree, that will not sucker, do not graft on any of those suckers. Wherever the peach will grow it is best to graft on peach stock; nevertheless, east of the Rocky Mountains they graft peaches on plums. We do the reverse, and wherever you have good moist soil, you can graft on the peach or on most anything that will take the plum.

Mr. W. H. Aiken: There is another prune besides the French prune that is well spoken of. I think they call it the Hungarian prune. It is a prune that will ship well; that is an upright grower, and needs to be pruned to make form and shape. I would say, don't prune a plum tree much; but that prune, like many plums, will shoot right up in the air so that it is impossible to pick the fruit. There is no sense in letting it grow so that you can't get the fruit when you raise it. You want to give it a good bearing space where you get it. The German prune is a good shipper, but, indeed, of any fruit, the French prune will ship East, and that is what we are going to do, if we get low freight; send them all over there. I really believe that the French prune is the best drying plum we have, but I do not want you to go into the prune business; I am in it myself, and I do not want to invite competition, but, undoubtedly, the prune will do well on good soil. People tell me that poor soil is good for fruit; I do not know what it is good for; it is not good for fruit in my estimation; you cannot get a soil too good for fruit, nor too rich, but trees grown in good soil must be pruned.

Mr. Gray: I think it is a mistake to call the Italian prune a good shipper. I would not advise anybody to plant them for shipping. In the first place they drop from the trees before they ought to be picked, and when they are ripe they are so soft that you cannot dry them at all in any dry-house I have ever seen. If you get them dry enough they will drip; if they are not dried quick enough they will granulate. They are a very poor fruit. We have a great many more of them than we wish we had. The only way we can dry them is to cut them just as we do the plum and sell them for a sweet plum.

Mr. Wilcox: There is more than one kind of German prune—one originally egg-shaped. I raised that. There is another kind, and they, I believe, are what Mr. Aiken says are very good to ship. There is also the Oregon Silver prune, very large, something like the egg plum, and which was thought by some of us to be merely Coe's Golden Drop. It is very large, and it makes a beautiful prune.

PROTECTION TO THE FRUIT INDUSTRY.

The convention met for the fifth and last day's session on Saturday, November twenty-third, President Cooper in the chair.

Mr. Aiken presented a report on the protection of the fruit interest, with a memorial, as follows:

Los Angeles, Cal., November 21, 1885.

To the Fruit Growers' Convention of California: Your Committee on a Memorial to Congress would respectfully recommend the adoption of the memorial herewith submitted, and that the same be signed and certified by the President and Secretary of this convention, and copies of the same be forwarded to each member of the California delegation in Congress.

W. H. AIKEN,
Chairman of Committee.

MEMORIAL OF FRUIT GROWERS OF CALIFORNIA.

Los Angeles, Cal., November 21, 1885.

To the honorable the Senate and House of Representatives of the United States, Washington, D. C.: Your memorialists, the fruit growers of the State of California, assembled in their annual Convention at Los Angeles, this twenty-first day of November, 1885, most respectfully represent:

That the soil and climate of the State of California are adapted to the production and preparation of the prune, the raisin, and the olive of good quality and in quantities sufficient, eventually, to supply the demand for such products in the United States.

That these important industries are in their infancy and stand in great need of protection from competition with foreign prunes, raisins, and olive oil produced by the cheap labor of Europe.

Your memorialists have found by actual experience that the present duties of 2 cents per pound on prunes and raisins and $1 a gallon on olive oil afford no real protection, and give little encouragement to those engaged in these great and growing enterprises in California.

That an import duty of 3 cents on prunes and raisins and $2 per gallon on olive oil would enable California to successfully compete with the world in these products in the markets of this country, and pay fair and full wages to American labor.

The growing of the orange and lemon in the United States should also be encouraged and protected from competition with the products of foreign lands, and, in the opinion of your memorialists, the duties on these products are entirely too low.

Your memorialists further represent: That the Mexican reciprocity treaty now under consideration for Congressional action seriously threatens the future of many agricultural industries in the United States and especially that of fruit growing in California.

The long established policy in this country of the protection and encouragement of American labor and American industries should not be changed so as to practically protect and encourage Mexican labor and agriculture.

The Mexican reciprocity treaty would in effect admit the Republic of Mexico to the Union, to a share in our great prosperity, and give its people a right to compete with Americans for trade in our markets without bearing the burdens of this Government, and without any love for this country.

Your memorialists, therefore, respectfully and earnestly request the Congress of the United States to so adjust the tariff on the products above referred to, as to make us a prosperous and independent people, and to decline legislation intended to enforce and put in operation the Mexican reciprocity treaty.

DISCUSSION.

Mr. Aiken: This memorial does not ask for a perfect protection, and yet it seeks to acquire what we so much need. I believe in American institutions; I believe America should provide for the many. I believe we can raise the prune, raisin, and olive, and also the orange and lemon that will supply the markets of this country, and keep at home our money, and I hope there will be a free discussion of this matter, because we ought to hear from everybody.

Mr. Hatch: While I indorse the memorial from personal reasons and for the benefit of the State of California, at the same time I do not think there is a real estate agent in Los Angeles that would indorse that unless they knew that Congress would act favorably upon it, as it would hardly like to place before the eastern people that we cannot make profits on these very things; that is, sufficient profits without extra action in our favor. As it now is, we can make living profits, it is true. If we are assured that favorable action will be taken upon this we could make extraordinary profits. The question seems to be in my mind: Is it advisable for us to place such an advertisement before the world?

Dr. Kimball, of Alameda: I think that the principle involved in this resolution, or memorial, is decidedly unjust to the status or standing of California at the present day, because we go before the nation as a supplicant; a little handful of people on this coast that are engaged in raising the olive, the prune, the raisin, grape, and the fig, we go before the people of this great commonwealth that reaches from sea to sea, a boundless empire almost, and we ask them for protection. It places us in an unjust position in regard to ourselves, in regard to our great prosperity, and in regard to our great prospects for the future, and as Mr. Hatch has just said, I believe that every real estate agent ought to take up his tomahawk and scalping knife and go for the memorial. It is an advertisement of our inability, notwithstanding our favored soil and our wonderful climate, and all these things, to compete with the people in Germany, and where they are raising prunes. Is this an advertisement that will bring emigrants here to California, that will cause the peasant of Europe to come out here and work for us? I think that the gentlemen when they advocate this memorial are slightly mistaken. The protective policy has been the policy of my whole life, but when we come down to the question of compelling the people from the Gulf to Canada, and from the Atlantic to the Sierra Nevadas to pay 2 cents more a pound for the plums in their puddings, I don't believe it will do. I believe that the people will regard it as a kind of an insult when they read the magnificent reports that are sent from this glorious country here, and this beautful climate, and find that men are making $250 per acre from the raisin grape, and that those poor benighted individuals around the bay are making $150 to $200 per acre from their prunes, and still they want help, while the people in the mountains in the East are willing to work for a profit of $3 per acre, or even $2, and I, for one, am not in favor of the memorial.

Mr. Bettner: I concur to a large extent in the views that have been presented by Dr. Kimball; that is to say, in the reasonableness from one standpoint of those views, but as the manufacturer sells protected goods to the fruit grower and to the agricultural interest, so as to receive all the benefit of what has been, I may say to a certain extent at least, the policy of this Government, it is not right that the agricultural interest should bear all the burdens. We have often seen a representative of the interests of this country go to Congress and claim substantially as to the manufacturing interest, what Dr. Kimball has said referring to Southern California. This agricultural interest will bear the burden and receive none of the benefits from this proposed Mexican reciprocity treaty. Such a treaty of reciprocity with Mexico strikes directly at some of the most important interests of the country, not only the fruit interest, but some other interests of the State; also the tobacco interest and the sugar interest of Louisiana. Why on the same principle ought not the agriculturist to have the benefit of the free trade of England, France, and Germany, and other nations that export to this country, instead of paying, as now, the high tariff, which increases the cost to him of producing every article that he does produce?

Mr. Wilcox: I am in favor of the protective tariff so far as it is necessary in the commencement, and this may not be necessary always. I understand from Mr. Blowers, who took the premium at the World's Fair, at Philadelphia, for American raisins, against the world, that he has not made a fortune at that business. I met him in New Orleans last year, and he still asked for a tariff, and circulated his petitions a year or two ago for that purpose, and I believe at the present time it would be a wise policy to do so; because if we undertake to compete with the producers of Europe, it means that we compete in the price of the labor also that produces those products in Europe. Capital is also cheaper there, and a vineyard in France that is worth $2,000 per acre, is worked on capital worth 2 and 3 per cent annually. Now, if we want the laborers here to thrive and to invite laborers from all parts of the world, let us tell them they can make money here, as well as to enjoy, in company with us, our beautiful sunshine. Only a few years ago we did not know that we could make wine for the market, and it was only by a protective tariff that we succeeded in doing it. We may not always need it for producing wine; we do not think we will. As soon as the people find out what our wine is, and like it as well as they do any other wine, we can compete with any producers in the world. So it is with raisins. After we get started and our raisins have a reputation, and the people want them and feel that they must have them, they will pay our price; but we have certain disadvantages, and I think that protection on the start would be a great advantage to the fruit industry of this State and the laborers of the State.

Mr. Hatch: So far as the reciprocity treaty with Mexico is concerned, I think it is of vital importance, and we should all indorse most anything that is antagonistic to it.

Mr. Milco: I will state concerning the protection of sweet oil, and of the prune and the raisin, from my own experience. I know that in Dalmatia, which is a great olive country, the laborers are paid from 15 to 25 cents a day, and the oil there is worth something in the neighborhood of 50 cents a gallon. Now, the freight from that country to New York these days cannot be very much, and if we should allow the oil at any time to come into competition with our oil in this country, no matter who has got an olive orchard, he will have to cut it down, because those people at 50 cents a gallon for their oil will make money while we will starve. I cannot get anybody to work for me for less than $30 per month and board; that is, white men—men that will stay with me year in and year out. Of course, I can pick up tramps and work them two or three days for half a dollar each, but as soon as they get a little cash they will go. I want men that will build up this country, and if we pay white men good wages we expect those men will stay and grow up with us, and whenever they make a little stake they will be looking around for a little piece of land to plant a little orchard or vineyard, or something of that kind. But if we are going to allow European goods of that sort to come in competition with us, such as raisins and prunes, and particularly sweet oil, unless we have a protective tariff, as my friend, Mr. Wilcox of Santa Clara, says, for a certain period, until we educate the American people to our product, we will not succeed. I will give you a little experience in my own business, this buhach for an illustration. When we went to New York City and offered our production, pure as it was, to those people over there, they said: "Create a demand for it; we do not know anything about your goods. If there is a demand for it we will buy it; if there is no demand we do not care about it. We are handling those goods from Europe and they suit us." That is what they told us; but just as soon as we made the people understand, and asked them to go and buy it and try it, they can't sell those other goods at all. They have them and they are rotting on their hands, and so here and every other place you must be encouraged. We must be given a chance to introduce our own goods to our own people, and so the chances will be that when we get to grow it largely it will probably compensate us for what we will probably have to sell for less; but to introduce any new goods, no matter what it is, of the production of this country, it takes all a man can get out of it to place it. That is my experience, and unless we have some protection we will have a hard road to travel.

Mr. Wilcox: Those who know our prunes know they sold very readily for 10 cents a pound up to two years ago; within the last year the highest quotation in our market has been 5 cents. That shows which way the wind blows, and those who intend to raise prunes largely expect protection if they need it. I think it safe to ask and receive protection for a limited time.

Dr. Congar: It seems to me that in the first place that we should ascertain how much pure olive oil is imported to this country, and to ask Congress to pass a law to have inspectors so as to know how much cotton-seed oil we are using and how much real olive oil is brought to this country. I cannot find a bottle of pure imported olive oil in a drug store, nor grocery house, nor other places where it is supposed to be kept. I bought one bottle of olive oil from our President, and I defy any person to go into any house in this city, or to any other place in Southern California and find an article that compares with it; in other words you cannot find any olive oil. Now, ought we not to know how much oil we are receiving from abroad before we ask Congress to protect this cotton-seed oil at the rate of $2 a gallon? That is what ought to be done. Congress ought to pass a bill to find out the adulterations in the first place, and then we can legislate to protect that which should be protected.

Mr. Bettner: There seems to be a difference of opinion, and whatever action should be taken on this question, should go before the country as the unanimous expression of this convention. Now, so far as the memorial refers to the reciprocity treaty, I believe that there can be but one idea, and as a member of that committee, so far as I am concerned, I am perfectly willing that our reference to the other matters, excepting as to the reciprocity treaty in that memorial, be withdrawn, and that we go before the Senate and House of Representatives with the memorial referring to that reciprocity treaty, which undoubtedly is unjust, inasmuch as it is special legislation intended to benefit a certain set of our citizens at the expense of the other.

Mr. Aiken: As to that, this matter was referred to the committee and we had to deal with all this subject of prunes, raisins, olives, etc. The committee, in starting out, thought that they would place it in the form that is presented before you. Just because one or two gentlemen have very strong ideas upon the subject, I do not see that that is any very good reason why we should abandon this great movement. All of us must admit that when we come in competition with foreign labor in the preparation of these very things, we cannot raise them or prepare them or sell them in our markets. There is the matter of freights; we all know that 2 cents a pound would give us more than the foreigner receives or expects to receive for his fruit, and they have cheaper freight than we do. Now, to come down to the raisin and dried fruit: Put them in the market at 2 cents, and we would have to abandon our homes and take to the woods and go to logging. So far as the raisin is concerned, my friend Mr. Blowers said to me very lately: "I shall destroy my raisin vineyard and put in alfalfa and go to raising hogs." That is the situation he is in. It is time now for us by main force to protect the horticultural industries in this country, and, as was very well said by Mr. Bettner, the agriculturists have asked very little and have received very little in this country. Our protection is almost nominal, while every manufactured article that agriculturists use is protected. If that is the policy of this country, why not share in that protection? We certainly ask but very little. They are giving us now 1 cent on prunes; we ask in addition, 1 cent to build up this industry, and to save three millions of money at home, and to keep up good prices for American labor. Now, the reason why the price of the prune was reduced from 10 or 12 cents to 5, was because the foreign prune raisers threw upon this country a bankrupt stock of fruit last year. They had an excessive supply, and rather than dump those prunes in the ocean, they sent them over here and sold them for whatever they would bring, and, of course, broke down our market. The protection of 1 cent a pound was nothing to them, owing to the cheapness with which they could raise them, and with the cheap rates of freight across the ocean, they utterly destroyed our prune market. The prunes of California cannot sell in competition with foreign prunes at 1 cent protection, and I do hope this memorial may be at least adopted by a large majority of this convention, and given out to the world as the expressed opinion of the fruit growers of California.

Dr. Kimball: I am opposed myself to the Mexican reciprocity treaty, but in regard to my friend of the Santa Cruz Mountains, Mr. Aiken, I would like to give the convention the result of a little figuring. That is a prolific country where he is, and I think I have heard the gentleman himself state that he has had very young trees, that bore in the neighborhood of six hundred pounds of prunes. I have figured on the basis of three hundred pounds to the tree, and one hundred and twenty-seven trees to the acre, and that will give the astounding result of thirty-eight thousand one hundred pounds of green fruit per acre. You all know that prunes dry down about three to one, and that would give us about twelve thousand seven hundred pounds of dried fruit per acre, which, at 2 cents a pound, would amount to the sum of $254; and if the people of California cannot live on the profit of $150 per acre, throwing out the balance, they had better stop business. Prune orchards are one of the best paying things in this State, even at 4 cents a pound, and the idea that we should inform the whole American people, where they are not able to raise prunes, that we must throw upon them the penalty of having to pay an excessive price of 2 cents more a pound for prunes for the purpose of putting additional benefits into the hands of growers of prunes in California, who have already became rich at it. I think it essentially a wrong idea. In regard to my friend, Mr. Milco, who believes in a high duty on olive oil, I wish to make the suggestion, or the inquiry rather, as to how long he thinks it will take for the people of the United States to become great olive oil consumers, if they have to pay a duty of $2 a gallon. If there is a protection of $2 a gallon on all the olive oil imported, there is no such thing as a reformation which will result in using olive oil largely in this country, and we shall all die of starving before that time will come. It is well enough to be satisfied with a good thing, and the profits of the people of the East are much smaller than ours. Notwithstanding you receive small profits on the production of the orange, yet wisely managed and wisely conducted, there are profits in your orange orchards, there are profits in your grape and raisin interests, for the consumption of your fresh grape and of your raisin is immense and it is increasing. It seems to me that the policy of the people of the State of California should be to furnish the largest amount of good fruit at the cheapest possible price, instead of hunting about and rendering it more difficult to obtain it, and that this should be the purpose of every one engaged in this business in California.

Mr. Rice: As the gentleman said a few minutes ago, the real estate agent has his tomahawk and scalping knife, and is figuring the probable profits he can make on an orchard. I am very sorry he gave the figures of the profits in growing prunes. A few years ago a gentleman from San Francisco—Mr. Pixley—was down here, and he saw a gentleman who had just sold his oranges off of one tree for $10. Mr. Pixley figured up and said one hundred trees to the acre would yield $1,000 per annum, and that on a small place of just one hundred and sixty acres, a section of land, his income for the year would be $160,000. It was not a very big farm, either, and the oranges were just commencing to bear, so in a few years it would be much larger, and every real estate agent in this country (there is only a few of them, by the way) have been using the figures ever since, and the latest bulletin I have seen from the real estate office is doubling on it, because the trees are growing a great many more oranges. This argument may be good to a certain extent. We are making a fortune out of our prunes and olive oil, and so on, in some instances. I know one gentleman this year who has got five acres of Muscat grapes, and he has got the coin in his pockets—$1,250 for that raisin crop; $250 per acre. That is a very handsome profit, but those are not the figures of the whole raisin crop of Southern California or of this county for this year. I am afraid when the balance sheet is made up of the raisin crop this year, it will not show much more than $25 profit per acre; and, by the way, one firm that has fifty acres of raisins out in this range, is not going to make a big profit on it, and on the whole there is not so much profit. I know a gentleman that did not make a cent out of it; in fact, he lost money. It must be an isolated case that can make large gains. It is true that we view this tariff question by our own opinion, and our local ideas and our political predilections, and we want to stand by them through thick and thin; but I would like to see the farmers stand together on something, even if it is no more than to protect our interests here in California. I hope we will all stand together on this home memorial. I would like to see it adopted unanimously.

Dr. Chubb: I think that there are reasons why we can ask for this additional aid in a certain direction aside from the Mexican reciprocity treaty. Now, we have been discussing here the best fruit for profit to grow in this State, and we have got all the information possible as to whether the prune is a profitable fruit, in the opinion of the men who have gone thus far in its cultivation. It is with very great difficulty that we even get a recommendation to plant the prune, and why? They say it is very doubtful whether it will prove a profitable crop in the State. We, in the southern part of the State, do not know much about the prune crop, but we do know about the raisin crop, and if the raisin crop were as profitable as some men seem to imagine, the real estate agents of this and every other city in the State of California would not need any other inducement to bring any amount of immigration into this country. The fact is, gentlemen, that while there are exceptions to all rules, the raisin industry is not a profitable industry at this present moment. There are a great many drawbacks to that as well as to the other fruit industries of this State, which are only discovered when the man thinks he is going to make a fortune and starts in making raisins. The foreign crop of raisins is produced in a country where on a general average the labor is only 10 cents a day, and it is not the poor man there that makes the profit. It is the system that cramps him down to that and keeps him there, and the dealers who take the raisins off his hands at those prices are the men who make the money off of it. We do not propose that our American labor shall be reduced to that situation. We hope to offer inducements to American labor to produce these things that are so largely consumed in our own country, and these industries for which we ask protection to-day are not California industries specifically; they are American industries, they are a part of the interests of this great commonwealth and must be protected if they need protection. The idea that it is an additional burden to consumers in the East, I believe should be looked at in this way: We are consuming the products of eastern labor which have had protection for years, and which is still planning for protection, and we are only asking a reciprocal advantage for our industry. The very fact that we might add 2 cents to raisins or to prunes is not going to be an observable item in the consumption of these articles upon the American continent. It is not that it adds to the expense of the consumers, but that it is so much more of a protection against the introduction of foreign fruits. The question comes then, with this additional import duty upon foreign fruits, that with all their advantages and cheap labor can they afford to flood this country with foreign fruits to the disadvantage of our own. That is the point we are endeavoring to make out. It is not that we want to oppress the eastern consumer by adding to the price of consumption, but that we want to shut out to a certain extent the profits given to foreign pauper labor and to foreign capitalists upon foreign fruits to the disadvantage of our own. All we ask is that we have the same free, generous support in the development of these interests that our eastern friends on the Atlantic shore have had to like industries for years.

Mr. Wilcox: I am proud to represent that section where the prune industry seems to be most extensive. In Santa Clara Valley it is a serious question now about the future of the prune. There was a prune excitement a few years ago, and everybody who had ground paid all they asked for the trees and put out the prune. The highest the prune will bear, that I know of, is six hundred pounds—full grown trees—and the ground was irrigated. Now, when a prune tree gets of a certain height it does not grow well. It bears on the ends of the limbs, and will exhaust itself in time, and that is a matter that should be taken into consideration. I remember when prunes sold for $1 a pound; they came down gradually, but were high until California brought the prices down, and it is us that the eastern consumers have to thank that the prices are what they are now—so I say it is safe to give us a little protection at this time.

Mr. Hixson: There is no doubt, whether we get additional duty on prunes or not, that this is one of the great industries of the State, and it is not going down, even if we do not succeed in getting more protection. I do not pretend to say but what a cent more a pound would help us; but suppose we do not get it? I don't want the people who read these proceedings here to think we are going to become paupers if we do not get it. I have received a letter, since I have been in this city, of the sale of some of Dr. Kimball's prunes at 8 cents a pound. There is no trouble at all about our raising prunes and selling them for enough to give us a profit. All you have got to do is to raise good fruit and put it up in good shape. We can put it up as well as the French, and they don't expect less than 12½ and 15 cents a pound; and when you get good prunes, like Dr. Kimball raises, they will sell. If you will just prune your trees a little more, I will guarantee to sell the fruit. I don't want it understood that I am not in favor of this memorial, but I want you to understand that if you do not get it, there is still a chance for people to make a living without it.

Dr. Kimball: I move an amendment to that memorial, to strike out all except what refers to the reciprocity treaty.

The amendment of Dr. Kimball was lost.

Upon motion, the memorial was unanimously adopted.

Mr. Bettner offered the following resolution, which was adopted unanimously:

Resolved, That it is the unanimous sense of the fruit growers of California here assembled, that the Mexican reciprocity treaty, and all other Spanish-American treaties now before Congress, are opposed to the fruit interests of California, and other great agricultural interests of the United States, and that any legislation tending to carry them into effect should be opposed by every delegate to the Congress of the United States from this State, and that the Secretary of this convention be instructed to forward a copy of this resolution to every member of that delegation.

TRUE LABELS.

Mr. Webb offered the following resolution, which was adopted unanimously:

Resolved, That Congress be requested to so amend the revenue laws as to require every article imported, whether dutiable or free, intended for human consumption, to contain a true label of its contents; it to be subject to confiscation by default.

ADJOURNMENT.

Dr. Chapin: I move that the convention express its thanks to Los Angeles Pomological Society, and its obliging and efficient committee, for the kind attention and valuable services they have rendered the fruit growers of the State during the sessions of the convention, and also to the press of Los Angeles, which has made such thorough and complete reports of the proceedings of the convention.

The motion was carried, and the convention adjourned sine die.

In the evening the citizens tendered the members of the convention a banquet, presided over by his Honor Mayor E. F. Spence, who also delivered the speech of welcome. The following day carriages were furnished the members of the State Board of Horticulture, who were driven around the city and immediate vicinity, thus affording them an excellent opportunity of viewing the magnificent groves.

MEMBERS OF THE CONVENTION.

Ellwood Cooper	Santa Barbara.
Dr. Edwin Kimball	Haywards.
H. C. Wilson	Red Bluff.
W. A. Spalding	Los Angeles.
W. N. Monroe	Monrovia.
W. M. Boggs	Napa.
S. F. Chapin	San José.
B. M. Lelong	Los Angeles.
O. P. Chubb	Orange.
O. H. Congar	Pasadena.
Alexander Craw	Los Angeles.
Joseph Wolfskill	Los Angeles.
L. C. Waite	Riverside.
R. P. Waite	Riverside.
O. W. Childs, Sr.	Los Angeles.
O. W. Childs, Jr.	Los Angeles.
J. B. Parker	Orange.
W. S. Smith	Orange.
Fred. L. Alles	Los Angeles.
Mrs. Kate Parker	Anaheim.
C. F. Loop	Pomona.
T. Staley	Anaheim.
L. W. Prebble	Tustin.
G. Horoland	La Dow.
I. H. Kellam	Tustin.
J. W. Sallee	Pomona.
C. J. Lorbas	Pomona.
L. Parker	Anaheim.
Geo. Rice	Highland Park.
A. W. Potts	Highland Park.
J. G. Galloway	Tustin City.
Ernest Watson	Duarte.
H. S. Daniels	Duarte.
L. L. Bradberry	Duarte.
F. W. Fowler	Duarte.
M. Baldridge	Citrus P. O.
C. E. White	Pomona.
Chas. Wiele	Pomona.
W. C. Mullock	San Gabriel.
E. C. Glidden	Los Angeles.
L. C. Winston	Pasadena.
J. C. Newton	San Gabriel.
Geo. S. Patton	San Gabriel.
C. T. Adams	Alhambra.
E. L. Mayberry	San Gabriel.
Chas. Richardson	San Gabriel.
O. H. Burke	San Gabriel.
H. Harbert	Alhambra.
W. P. Gardner	San Gabriel.
W. B. Wall	Tustin City.
Chas. Sheats	Tustin City.
Thos. A. Garey	Los Angeles.
Thos. Leighy	Los Angeles.
H. Neighmeir	Los Angeles.
H. Grosser	Los Angeles.
Chas. Winston	San Gabriel.
James Tiernan	San Gabriel.
J. DeBarth Shorb	San Gabriel.
J. R. Dobbins	San Gabriel.
R. H. Shoemaker	San Gabriel.
Cooper Bros.	San Gabriel.
L. C. Anderson	San Gabriel.
A. B. Chapman	San Gabriel.
A. Scot. Chapman	San Gabriel.
W. Cogswell	Sierra Madre.
Abbot Kinney	Kinneloa.
J. F. Crank	Fair Oaks.
A. Brigden	Lamanda Park.
Spencer K. Sewall	Lamanda Park.
E. A. Allen	Lamanda Park.
W. T. Clapp	Pasadena.
R. F. Lotspeitch	Orange.
W. D. C. Dimmock	Orange.
Mrs. M. A. Clark	Orange.
Samuel Rusk	Orange.
S. K. Snow	Tustin City.
P. Potts	Tustin City.
Broyan O. Clark	Pasadena.
Wm. Chippendale	Duarte.
C. Wise	Los Angeles.
Cora E. Wise	Los Angeles.
Fred. Smith	Pomona.
H. L. Martin	San Bernardino.
John J. Jones	Orange.
Geo. W. Foord	Santa Ana.
F. W. Dimmock	Los Angeles.
A. W. Francisco	Los Angeles.
A. F. Coronel	Los Angeles.
W. R. Carson	Los Angeles.
J. N. Sewall	Los Angeles.
F. M. Choquill	Los Angeles.
William Niles	Los Angeles.
W. L. Phillipps	Alhambra.
A. Phillipps	Alhambra.
G. B. Adams	Alhambra.
A. C. Weeks	Alhambra.
Francis Q. Storey	Alhambra.
C. E. Meedlan	Alosta.
C. E. Thom	Los Angeles.
E. M. Ross	Los Angeles.
A. F. Kercheval	Los Angeles.
L. J. Rose	San Gabriel.
James Foord	San Gabriel.
L. H. Titus	San Gabriel.
John Philbin	Los Angeles.
Sam. McKinley	Los Angeles.
Dan. McKinley	Los Angeles.
W. D. Bigelow	Los Angeles.
O. H. Bliss	Los Angeles.
W. H. Workman	Los Angeles.
Mrs. J. E. Hollenbeck	Los Angeles.
Al. Workman	Los Angeles.
James Bettner	Riverside.
J. M. Asher	San Diego.
Frank Kimball	San Diego.
A. S. White	Riverside.
L. M. Holt	Riverside.
J. M. Mitchell	Pomona.
L. N. Breed	Los Angeles.
W. R. Rowland	Los Angeles.
R. F. Del Valle	Los Angeles.
J. Downey Harvey	Los Angeles.
J. A. Graves	Los Angeles.
Eli Messenger	San Gabriel.
B. T. Smith	Pasadena.
N. A. Hall	Alhambra.
S. B. Kingsley	Alhambra.
C. Z. Kellogg	Alhambra.

SIXTH ANNUAL FRUIT GROWERS' CONVENTION.

The Sixth Annual Fruit Growers' Convention assembled at Sacramento, Monday, November 15, 1886, at eleven o'clock A. M. It being desirable to delay until the arrival of further delegates on the noon train, a recess was taken until two o'clock, at which time the Convention was called to order by Ellwood Cooper, Esq., President of the State Board of Horticulture.

On motion, P. W. Butler, of Placer, and I. A. Wilcox, of Santa Clara, were elected Vice-Presidents, and A. T. Perkins, of Alameda, Assistant Secretary.

MEMBERS OF THE CONVENTION.

John Rock	San José.
G. Tossetti	San Leandro.
A. T. Abbott	Sutter County.
L. W. Buck	Vacaville.
A. Block	Santa Clara.
Mrs. E. A. Butcher	Santa Clara.
Theo. Deming	Sacramento.
E. W. Maslin	Pino.
H. C. Blake	Vacaville.
James Shinn	Niles.
N. Wagenseller	Ukiah.
L. H. Cary	Oakland.
S. N. Wycoof	Watsonville.
D. J. Parmele	Vacaville.
J. T. Boggs	Martinez.
M. G. Vallejo	Sonoma.
A. A. Hyatt	Vacaville.
J. H. Thomas	Visalia.
P. V. Veeder	Grafton.
J. H. Guill	Chico.
J. R. Marston	Newcastle.
George D. Kellogg	Newcastle.
B. M. Lelong	Los Angeles.
G. M. Gray	Chico.
Ellwood Cooper	Santa Barbara.
H. Weinstock	Sacramento.
B. G. Stabler	Yuba City.
J. G. Hall	Walnut Grove.
A. T. J. Reynolds	Walnut Grove.
A. Scot. Chapman	San Gabriel.
Alfred T. Perkins	Alameda.
I. A. Wilcox	Santa Clara.
Milton Thomas	Los Angeles.
Dr. C. Grattan	Stockton.
A. J. Biglow	Antioch.
Robert Williamson	Sacramento.
W. Gagan	Courtland.
Solomon Runyon	Courtland.
P. B. Green	Courtland.
S. M. Calloway	Courtland.
E. C. Clows	Stockton.
W. C. Blackwood	Haywards.
C. W. Reed	Sacramento.
M. Van Gilder	Sacramento.
W. Walter Greer	Sacramento.
Frank Wiltro	Colusa.
R. B. Blowers	Woodland.
Frank H. Buck	Vacaville.
S. J. Stabler	Yuba City.
C. H. Kellogg	Newcastle.
C. M. Silva	Newcastle.
W. H. Aiken	Wrights.
Geo. Husmann	Napa.
Wm. M. Williams	Fresno.
Leonard Coats	Napa.
Gilbert Tompkins	San Leandro.
S. W. Hayne Perkins	Sacramento.
N. Martes	Roseville.
E. J. Wickson	Berkeley.
A. K. Whitton	San José.
W. J. Wilson	Newcastle.
W. F. Cronemiller	Penryn.
John H. Lewis	Newcastle.
D. T. Lubin	Sacramento.
G. W. Hinckley	Winters.
B. Browning	Penryn.
E. Booth	Riverside.
Geo. H. Booth	Riverside.
I. Alligretti	Berkeley.
L. D. Green	Walnut Grove.
R. C. Kells	Yuba City.
J. Studarus	Sacramento.
Joseph Routier	Sacramento.
Obed Harvey	Galt.
Jas. A. Roblin	Sacramento.
Mrs. H. Weinstock	Sacramento.
Mrs. R. Marks	Sacramento.
Mrs. Sol. Runyon	Courtland.
A. L. Harrison	Stockton.
K. H. Blate	Natoma.
J. T. McMurtry	Vacaville.
E. L. Hawk	Loomis.
John Crofton	Courtland.
A. Bouten	Healdsburg.
F. B. McKevitt	Vacaville.
A. J. Sweetzer	Novato.
Wm. N. Runyon	Courtland.
W. W. Smith	Vacaville.
F. C. De Long	Novato.
A. T. Hatch	Suisun.
H. Branch	Winters.
C. S. King	Haywards.
Silas Wightman	Sebastopol.
F. A. Chadburn	Suisun.
C. P. Westcott	Rocklin.
Wm. Johnston	Richland.
D. C. Vestal	San José.
H. C. Marvel	Wrights.
Leonard Stone	San Leandro.
John L. Sherman	San Leandro.
Louis Knox	San Leandro.
Wm. Knox	San Leandro.

C. Winton	San Leandro.
E. O. Webb	San Leandro.
J. H. Flickenger	San José.
B. L. Bartlett	San Francisco.
Rola Butcher	San José.
Charles W. Brett	Los Gatos.
D. C. Bands	Newcastle.
N. R. Peck	Penryn.
N. P. Chipman	Red Bluff.
J. C. Tyler	Red Bluff.
H. C. Wilson	Red Bluff.
Jos. S. Cone	Red Bluff.
G. H. Flornoy	Red Bluff.
A. Lockwood	Red Bluff.
H. Klotzer	Red Bluff.
John Bidwell	Chico.
R. E. Marvin	Chico.
C. T. Adams	Newcastle.
L. B. Annay	Haywards.
C. P. Westcott	Rocklin.
J. Ponstatt	Yuba City.
T. B. Hull	Sutter County.
J. B. De Jarnett	Colusa.
L. F. Moulton	Colusa.
A. Bedell	Roseville.
C. E. Williams	Yuba City.
G. T. Starr	Yuba City.
—. McPike	Sacramento.
W. R. Strong	Sacramento.
P. E. Platt	Sacramento.
Jno. C. Brusie	Ione City.
Edward Healy	Elk Grove.
H. W. Meek	Haywards.
Calmese Walter	Colusa.
Louis Cary	Colusa.
A. B. Crowell	Hanford.
Henry Kimball	Santa Cruz.
Alexander Kelly	El Dorado.
G. W. Parnell	Santa Paula.
Nicias Watson	Stillwater.
Judge C. C. Bush	Redding.
Hon. L. D. Freer	Oroville.
J. K. Pedlar	Yountville.
J. N. Rogers	Vacaville.
Thomas Roberts	Knight's Ferry.
J. B. Springer	Oroville.
Felix Gillet	Nevada City.
L. Scarse	Orland.
Henry Slubon	Orland.
Philip Titus	Goleta.
D. V. Thompson	Upper Lake.
Webster Treat	Davisville.
George West	Stockton.
W. B. West	Stockton.
E. L. Williams	Santa Cruz.
Wm. Slack	Vacaville.
J. S. Sherman	Vacaville.
M. Shaw	Vacaville.
E. L. Rudd	Woodland.
A. H. Reavis	Auburn.

PRESIDENT COOPER'S ANNUAL ADDRESS.

Ladies and Gentlemen: This will be the sixth annual convention of fruit growers, and the second held under the auspices of the State Board of Horticulture. We have met here to exchange views on the subject of fruit growing—to discuss every phase of the subject, that we may be better informed and more united—that in the end our efforts will be crowned with greater success.

The loss of time, the waste of money, and discouragements that arise for want of knowledge in the growing of fruits, is probably greater than in any other business, consequently the greater importance that we inform ourselves. We are not here, my fellow citizens, merely to make a display of our knowledge, or to place ourselves in a false position in trying to impress upon our hearers self-elevation or riper experience, but to give out the little we know in a frank and candid manner. Let us be governed in our discussions with the greatest liberality towards each other, and give to every individual the full measure of value, as estimated by the author in his or her experiments. Let us put our minds in a passive state, so as to receive more light, that we can return to our homes edified and thankful for this meeting.

I shall not attempt to enlarge upon the subject of fruit culture, for the reason that every branch of the subject has been ably discussed, with figures given, to prove the comparative value with other productions. The special advantages claimed for every part of the State have been fully presented, so that it is left for me only to refer you to those articles.

I call your attention to the report of the State Agricultural Society for 1885. First, the essay of Dr. H. Latham, page 184; the address of Senator J. A. Filcher, page 193. Following this, at page 203, we have the fruit product for 1885, with a general outline of the whole business, by George W. Meade & Co. For the prosperity of South California, the address of Joseph D. Lynch, page 426.

I beg also to call your attention to the compilation of Sergeant James

A. Barwick, in same report, page 276, on the climatic effect of the north wind.

It is not my purpose in this place to criticise any of the statements made, but I caution and warn you all against the enemies to successful fruit growing. What we want is individual success, financially, in what we have already planted, and every probability of success in further planting, if we desire to enlarge our orchards. In my present state of mind I could not do better than read to you the most part of my opening address at the convention held in Los Angeles one year ago. The subject presents itself exactly as it did then. I therefore refer you to that address.

We have made some progress during the year, but it is not at all flattering. In the southern counties, where the greatest alarm exists as to the ravages of the *Icerya purchasi*, commonly called white scale, no certain method or remedy has been adopted. It is still an experiment, and an undetermined problem. As to the black scale on the olive, nothing certain has been developed at a moderate cost. The codlin moth is extending its ravages; large apple growers are more or less discouraged. New insects and blights have appeared; climatic difficulties never before experienced in southern counties have destroyed nearly all the deciduous fruits. Olive orchards that should have been full of fruit, have nothing from the same cause. The English walnut, to a very great extent, very poor crop, with serious injury to the trees. The orange, lemon, and lime have done well.

The season opened early in November with copious rains, followed with warm and pleasant weather, and a like condition extending to the spring, giving us an aggregate rainfall of twenty-five and one half inches. All cultivators were jubilant over the prospects, and yet it has proved to be the only failure in Santa Barbara County since I have been there—a period of sixteen years.

The climatic conditions so unfavorable to the fruit crop was the result of a heavy rainfall of two inches April tenth and eleventh, followed by a cold north wind, lasting four days without ceasing. The ground being wet and cold, the flow of sap was arrested.

The cold and severe wind robbed the small twigs and branches of the sap contained in them, so that they were shriveled up, comparatively speaking, dry and dead. In some variety of trees there was not vitality enough left to repush the sap and produce a natural growth. Cherry trees, in full bloom, had the appearance of being scorched with fire. English walnut trees were a long time in recovering, and in many orchards the branches were killed back from *one* to *five* and *six* feet. It is extremely doubtful whether such trees can ever entirely recover. Nearly all varieties of peaches, excepting a few seedlings, failed. Plums the same; apples, to a certain extent, a failure. Pears suffered less than most deciduous fruits. The almond, being in full leaf, and the fruit formed, was not injured. The same was the case with the early apricot. Very late trees were not injured, as the time for the sap to flow had not arrived. The eastern black walnut, as an example, never did better than this year. English walnut orchards, where well protected by high hills and forest trees, on well drained land, were but little injured.

The marketing of fruits was discussed at greater length at our last convention than any other subject. The *fruit unions* seemed to be the panacea for disastrous results from low prices; but the expectations of growers have not been entirely realized.

It is true good results have been realized in southern counties from the orange crop, but other causes have aided—lower freights, a small crop, and heavy frosts in the South Atlantic Coast, destroying all the Florida oranges. In the disposal of fruits much wise counsel is needed; more united effort and greater harmony is essential if we wish success.

The prices obtained for the nut crop have been about 1 cent the pound higher than the past two years, with a very active market.

With reference to the experiments as mentioned on page 3 of the report of last year's convention, I will state that spraying with ice water was only a waste of money. Spirits of turpentine killed all the insects, took all the leaves from the tree, but did no other apparent injury. The kerosene oil wash was a success.

The State Board of Horticulture are now preparing the biennial report. It will contain all the transactions of the Los Angeles convention, as well as a full report of this; also the reports of the Inspectors. We will have a large number printed, that the fruit growers throughout the State can have the benefit of the valuable information contained in the same. We hope to have them ready for distribution early in the coming year.

The subjects for discussion, or your consideration, our Board have arranged in a printed programme, as follows:

SUBJECTS FOR DISCUSSION,

Divided into Four Classes—Nos. 1, 2, 3, and 4.

No. 1—Insect Pests and the Care of Trees.
No. 2—The Preparation, Marketing, and Disposing of Fruit.
No. 3—The Variety and Kinds of Fruit Trees to be Encouraged.
No. 4—Protection to Fruit Industry.

SUBDIVISIONS.

No. 1.

First—The most Inexpensive Remedies to Apply for the Destruction of Insect Pests. How to Apply, the Time to Apply, and the Cost.

Second—The Cultivation, the Pruning, the Time to Prune.

Third—Proper Laws to Prevent the Spread of Insect Pests.

Number One, in the order as given above, will be disposed of on Tuesday.

No. 2.

First—The Care in Selection, the Kind and Size of Packages, the Marketing and Shipping.

Second—The Proper Time to Gather the different kinds of Fruits, the Curing, etc.

Third—How the Fruit Growers are to Dispose of their Fruits without coming into Competition with each other as to Prices for the same quality and kinds of Fruits.

Number Two will occupy all of Wednesday.

No. 3.

First—The Best Varieties of the different kinds of Fruits to meet the wants of Consumers in the different Seasons.

Second—The actual Demand and Probability of Increase.

Third—The Encouragement to new Planters to Confine themselves to such Fruits as are not in sufficient supply, or in excess, and to those that the Consumption appears to be for the time being unlimited.

Number Three will occupy Thursday forenoon.

No. 4

Will occupy Friday until three o'clock and thirty minutes P. M. From three o'clock and thirty minutes P. M. until adjournment, to make arrangements for the next Annual Convention, to be held in 1887.

Thursday afternoon and Saturday vacant.

Time for reading Essays, and the discussion of same, to be determined.

On the suggestion of the President that it would be desirable to appoint a committee to rearrange the programme, because of the essays which are yet to be handed in, and on motion of MR. BLOCK, President Cooper, A. T.

Hatch, I. H. Thomas, S. J. Stabler, and Milton Thomas were selected as such committee.

Mr. Butler of Placer offered the following resolution, which was adopted:

Resolved, That the President of this convention is requested to invite the Hon. Leland Stanford to attend this convention when convenient, and if possible on Wednesday next.

The Secretary read the Essay on the Orange, by Mr. James Bettner of Riverside, as follows:

It is difficult at this time to write an article on orange culture in California that shall contain very much original matter, but as the growing of this, the king of fruits, is now attracting more attention than ever before, as new men in new fields are entering upon it, a paper upon the subject may be of interest, though much in it must necessarily be substantially but a repetition of what has been said and written before. To one desiring to grow his own orange trees, from the start, the first step to be taken is to procure good seed—the next to prepare a suitable seed bed.

The seed of the Tahiti orange has generally been used in Southern California, and the plants from it make good stock either for seedlings or to bud upon.

It is important in case the grower should design to plant his orchard, or any part of it, in seedlings, that he should take care to procure pure unhybridized seed.

For the purpose of propagating seedling trees the seed from our California orchards would be improper to be used. Limes and lemons are found in or near all our orchards, and multitudes of bees intermix the pollen of the different flowers.

Some worthless "hybrid" therefore might result from the use of native seed.

The seed of the orange must never be allowed to dry before planting It may be most readily and cheaply obtained by buying a quantity of decaying Tahiti or Mexican fruit from some of the San Francisco commission houses.

This fruit can be crushed in a tub or convenient receptacle and the seed washed out.

The sour orange of Florida is very hardy and is said to make an excellent stock. Seeds can be had from Florida packed in damp moss.

A quite small piece of ground suffices for a seed bed; in a space say twelve by twelve feet, thousands of young plants can be grown.

The ground should be thoroughly spaded, pulverized, and moderately enriched with perfectly well rotted manure. It should be located in a warm and sheltered spot, easily watered, preferably by sprinkling.

The bed should be inclosed with boards sixteen or eighteen inches high, set on edge, with a cloth covering arranged on a roller. Covering should be utilized to protect the young plants from the hot midday sun, and also at night, when the temperature is likely to fall near the frost point. The seed should be planted thickly and broadcast, and covered from one to two inches. The best season for planting is in the spring, after the ground has become well warmed and all danger from frost is over—about mid-April in Southern California. The ground should be kept constantly moist, but not too wet.

In a year the young plants will be ready for transplanting in nursery rows.

These rows should be far enough apart to admit of a cultivator working between them, say four feet; the plants may be set fifteen or eighteen inches apart in the rows. The nursery should be lightly manured yearly, and irrigated by running small streams on each side of each row once a month, from the time the plants are transplanted until the succeeding fall. The first three irrigations had better be made at intervals of a fortnight.

In the spring following the transplanting into the nursery, if everything has progressed favorably the young trees may be budded. The earlier the buds can be set after the sap flows freely and the bark of the young seedlings will "peel" readily, the better. These conditions will be quite certain to obtain early in April.

All nursery trees should be protected in winter by building a sufficient "staging" over them to support a good, thick covering of cypress or other evergreen brush, which brush should be securely laid on in such a manner as not to be easily displaced by wind.

Buds a year old (from the bud) and seedlings three years old (from the seed) may be placed in orchard form. Two-year old buds—but no older—are preferable to one-year old for this purpose. It is not desirable to plant any trees whose roots are over four years old.

Buds may be set at from twenty to twenty-five feet apart each way; seedlings from twenty-five to thirty feet apart. The earlier in the season nursery trees are moved into the orchard (after danger of serious frost is over) the better.

Trees will generally begin to put forth their first growth from the middle of February to the early part of March. When the young shoots of this growth have attained a length of about one inch, is in my judgment the best time for transplanting. Light subsequent frosts will not be injurious, and severe ones later in the season are rare in most parts of the State at all adapted to orange culture. The young trees should be taken up with as large a ball of earth as may be without danger of the earth breaking off and carrying with it the fibrous roots. For this reason better have your nursery in somewhat tenacious soil. If moving with a ball be impracticable, be careful to preserve as many of the fibrous roots as possible in digging, and if the trees are to be moved any distance, "puddle" them at once on taking up, viz.: have ready a thick, muddy paste into which dip the roots, and have damp straw or moss in your wagon-bed to pack closely about them.

Have your holes ready dug of *more* than sufficient size. Previous to digging these, it will be best to run a furrow down your rows the way they will irrigate, and directly on the line the trees will stand.

Your trees being set in the holes on one of these lines, turn a small stream of water down the furrow. It will run in the holes and settle the earth solidly about the newly planted tree, at the same time thoroughly wetting the ball of old earth, which it is important to do and cannot well be accomplished in any other way. If your trees have been moved without balls, care must be taken to spread out the roots; in either case the ends of the larger of these should be cut off smoothly with a sharp knife. Do not move your trees unless you are prepared to water them *directly* on planting. A delay of even one day in watering should be avoided.

I think it well to set the trees a little deeper than they stood in the nursery, but an inch, or even half an inch, is enough.

The young orchard should be irrigated fortnightly for three irrigations, subsequently once a month during the first season.

It will be sufficient for the first year to run one furrow each side of the trees, close to them, and allow a small stream to run by for ten or twelve hours at each watering.

The second season less irrigation will be needed. The same number of furrows will answer, and it will be sufficient to water once every six weeks, or even two months.

For the third year about the same amount of water will be used as for the second.

Beyond this, as the trees increase in size, it will be found necessary to gradually increase the number of furrows between the rows until eventually, when the trees attain the age of ten or twelve years and are producing good crops, your furrows should be run through the whole space at intervals of about three feet. The water should be run longer after the first season, from two to twenty-four hours, according to the nature of your soil as to porousness, *after it has reached the end of each row.* The amount of water needed for trees twelve years of age, in good bearing, will not be less than three times the quantity required by the same trees during their second and third years in the orchard.

I have hitherto spoken of but one way of irrigation, the best in my judgment for most conditions, viz.: the method by small streams in furrows. Two others are, however, practiced. One of these methods is to run a considerable head of water broadcast down each several row, shifting it from one to another as soon as the stream has run through.

To use this method your ground ought to be quite level, or serious washing is likely to ensue, and your soil ought also to be of rather a porous character.

Another way is to divide your ground into "checks"—squares proportioned in size to that of the trees—with raised sides, the tree being in the center and the soil drawn up the trunk to prevent the water from coming in direct contact with the bark, which might cause "scalding."

These "checks" are connected by a furrow down which you run the water to fill them. Begin with the *lowest* "check;" close the furrow leading into it. The "check" next above will then fill, and so on to the top of the row.

This method is a good one, as it economises water, and completely saves all fertilizing matter the water may contain.

It involves, however, considerable hand labor, though a good part of the work of making the "checks" can be done with the plow. In whatever way you irrigate, the ground should be thoroughly stirred as soon as dry enough, and *before* it has at all baked.

Pruning.

The heads of trees should be formed in the nursery at about three feet from the ground. The first season after placing in the orchard it may be well to let the sprouts that will form on the trunks remain as a protection from the hot sun. The next spring these should be removed, and thereafter all suckers and sprouts should be kept off. This may readily be done by going over the orchard and rubbing them off three times a year, say in May, July, and September or October. Beyond this, little pruning will be required for several years. What is done should be confined to the removal of crossing limbs and the shortening of branches that project or "lop over" excessively. In the early years of bearing the lower limbs will produce well, but later will lose their usefulness, and the height of the trunk may gradually be raised by removing them. The inner twigs and small limbs that will die as the tree advances in age should be removed, and the interior of the tree kept sufficiently open to admit light and air freely. Very much lateral shortening in of the branches will be followed by a corresponding loss of fruit. If practiced on young trees, the period of bearing will be delayed (excessive pruning in any direction will have the same effect). If on older ones, the crop will be lessened. The orange bears, for the most part, on the outer part of the tree.

Fertilizing.

It is well to manure nursery stock in order to obtain good, thrifty trees to start with. An orange tree has remarkable vitality, but there is a vast difference—other things being equal—between the results to be obtained by planting an orchard with healthy, vigorous young trees, and poor and sickly ones. The latter will be found dear at any price.

After placing in the orchard, very little, if any, fertilizing is needed in any ordinarily good California soil until after the bearing age has been reached; after that time it will be found judicious, except on very fertile land, to apply a light dressing of manure once a year, preferably in the fall before the rains.

Sheep manure is excellent where it can be had. Common stable manure is good. If applied yearly, a good horse load of sheep manure will answer to every twelve trees, one of stable manure to every six or eight. All manure should be applied broadcast.

Deep plowing in an orange orchard I consider to be of doubtful expedience. The orange is a surface feeder and fills the upper soil with fine roots. Too many of these are destroyed by deep plowing. Still, repeated irrigations followed by repeated cultivations at a uniform depth will, in many soils, cause a hardpan to form just below the point the cultivator reaches. In time this hardpan may become so hard that water will hardly penetrate it. At intervals, then, it may become necessary to break this crust, which may be done by deep plowing or running a subsoiler through the orchard, but it will be advisable to keep either tool at some distance from the trees, to avoid injury to the main roots, at least.

Protection from Frost.

It will be wise to provide some protection against frost for young trees, particularly buds, for the first two or three years in the orchard. Cypress limbs may be arranged about the tree, held at the base by mounding up the earth a little, and by tying at the top and at one or two intermediate points with bale rope; or corn may be planted between the rows of trees and dry cornstalks be used in the same manner. The covering should be put on carefully and securely, but not so tightly as to smother the tree.

I have up to this point endeavored to give briefly an outline of the methods to be pursued in the planting and management of a young orange orchard, necessarily omitting many details. There are some other matters that remain to be considered before entering upon this branch of fruit growing as a business.

As to varieties; as to general conditions essential to success; as to packing, markets, and marketing.

The leading budded varieties now grown in California, are in the order of their generally admitted excellence: First, the Riverside or Washington Navel; second, the Australian Navel; third, the Malta Blood; fourth, the Paper-rind St. Michael; fifth, the Mediterranean Sweet; sixth, the Large St. Michael; seventh, the Konah.

Besides these there are the fancy small varieties—the Tangerine and Mandarin; also a considerable number of standard size oranges, as the

Acapulco, Chuchupilla, etc. There is also a new variety called the Rivers, which promises to be of value as a late orange. The Riverside Navel orange has repeatedly carried off the premium "for the best orange" at the annual California citrus fairs held at Riverside. It is everywhere admitted to be the best orange grown. It is seedless, high colored, sweet, and a fine fruit in every respect. The only point that can be urged against it is that it is a rather early fruit, and will not hang well on the trees much after March first. The tree is healthy and reasonably vigorous, but after bearing begins, its annual growth becomes retarded, and I believe it will never attain very great size.

At present this variety commands a price in the market very considerably above that of any other (except the Australian Navel and Malta Blood); this is probably caused in part by the limited supply. Recent plantings have been made very largely of this kind, and it is likely the margin in difference of price will diminish with increased production in future years.

Second on the list I have placed the Australian Navel, only because at present little discrimination as to price is shown in the market as between it and the Riverside Navel. It is later in ripening than the last named, but inferior in appearance. The tree is a thrifty, strong grower—one of the strongest among the buds—but an unreliable bearer. I would not recommend its propagation.

The Malta Blood is a fine orange, and on account of its high color, fine, smooth appearance, and excellent flavor, brings about the same price as the Navel. The tree is of somewhat poor habit and lacks vigor. It bears well in my orchard, and elsewhere as far as I know.

I consider the Paper-rind St. Michael a very desirable orange. It is of small to medium size, from three hundred down to one hundred and fifty in a box (two hundred to two hundred and twenty-five is the size in largest demand in the East), of rather pale color, very smooth, thin skin, uniformly round in shape, sweet, juicy, and piquant in flavor, and an excellent carrier. It hangs well, and can be shipped as late as June, and even July first, to advantage. The tree is a strong grower and a heavy, regular bearer in every locality that I know of, and is one of the few kinds that will carry a heavy crop, and at the same time make a good wood growth.

The Mediterranean Sweet is valuable as a good to heavy bearer, as well as for being not only a good orange, but the latest keeping one we have (save perhaps the Rivers, of which I have spoken). The quality is a little irregular, in some years being finer than in others. The fruit is generally of high color, good shape and flavor, of medium thickness of skin, and contains very few seeds. It reaches its prime here in May or June, after other kinds, excepting the Paper-rind St. Michael and Rivers, are getting overripe, and is a good shipping orange all summer. The tree is of bushy habit, needing more lateral pruning and more removal of lower limbs than other kinds, to force it to something of tree form. The large St. Michael is a good orange, but has no special merit.

Some Florida varieties have been fruited at Riverside and elsewhere, notably the Homosassa and Magnum Bonum. These ranked a few years ago as the leading kinds in Florida. In California they have no special qualities to recommend them, and could hardly be distinguished from seedlings grown here.

Other Florida varieties are now being introduced—the Pineapple and Parson Brown among them—kinds very highly esteemed in Florida, but whether likely to be of equal value here may be doubted, judging from our experience with the Homosassa and Magnum Bonum. I should hesitate to plant largely of them to the exclusion of our own tested standard kinds.

To sum up, in setting out a budded orchard to-day, I should plant Riverside Navels, Malta Bloods, Paper-rind St. Michaels, and Mediterranean Sweets, in about equal proportions. I would not plant Navels exclusively, for two reasons: First, they have been very largely planted of late; and second, they must be marketed comparatively early in the season.

There has been considerable discussion in the past as to the relative value of seedling and budded orchards, and the partisans of the seedling side of the question still maintain their position. They urge that the seedling makes a larger, finer, and longer lived tree; that it is much hardier and will endure a much lower temperature than the bud; that it is a prolific bearer; that though the market price of its fruit is below that of some of the budded varieties, the much greater yield in a given number of years will much more than offset the difference; and finally, that many pronounce its fruit of as fine if not of a more delicate flavor than that of any of the budded kinds.

On the other hand, it is urged that buds bear earlier; that the fruit is more uniform in appearance and quality; that it sells at a higher price; and finally, that it ships better.

There is truth in all these arguments pro and con. The tendency is undoubtedly in favor of setting out budded orchards, and rightly so, I think. The seedling orange ripens early in the season and ships well until about May first. It then begins to lose its firmness, become overripe and often "puffy," and is liable to considerable shrinkage in shipping long distances. This is the main objection to the seedling fruit; but as there is likely to be no very considerable number of seedling trees planted in future, the supply of this fruit will probably always be in demand for the earlier shipments, and I consider a good bearing seedling orchard of equal value with any orange property.

General Conditions Necessary for Success.

The first of these is a suitable soil and location. Nearly all soils that will grow fair crops of any kind will support the orange. The red soil of the mesas and foothills has proved one of the best. A rich, sandy loam is perhaps quite as good.

It is desirable to consider the working quality of the land, and to avoid, on the one hand, that which is too stiff as likely to bake, unless worked at precisely such a time; and, on the other, that which is too light and porous by requiring too much water and fertilization.

It will be well to examine the subsoil. Lime hardpan is not particularly objectionable, the main fault to be found with it being that it is almost impervious to water, and if within a moderate depth from the surface, your ground will soon dry out and frequent irrigation be necessary. Other hardpans ought to be avoided. Your soil should be well drained and no surface water found nearer the surface than sixteen feet. Groves in Florida, planted on land with water near the surface, are said to be subject to "die back."

There should be a moderate slope to your land to allow of easy irrigation; avoid too much, as running water will wash it or put you to considerable expense to avoid this result. Six inches in one hundred feet is slope enough; less will answer. One foot in one hundred ought not to be exceeded, viz., if you expect to irrigate in furrows.

By using checks you can manage sidehills of considerable slant, as well as quite level land (by running water enough). On level land you can also use the flooding system.

Your location *must be free from killing frosts.* I should condemn any spot as unsuitable for orange culture where ice forms once or more in the majority of winters much over one fourth of an inch in thickness. I remember last winter, after the great Florida freeze, that some crank down there published an article, the drift of which was that the cold snap was rather a good thing, and that by a succession of such, the orange might gradually be brought to become a hardy deciduous tree, losing its leaves every winter and coming out in the spring refreshed by its winter rest. This article was copied in all seriousness by some of our leading California papers, and thus given a wide circulation; it is to be hoped to no one's loss. No idea could be more fallacious or mischievous if innocent people be led to act upon it.

Granting that by some process of acclimatization a semi-tropical evergreen could be transformed into a deciduous tree of the temperate zone, what would become of the fruit meanwhile? As it is, the fruit of the orange will perish, and must always do so, under a degree of cold much less than will cause any permanent, if indeed hardly any injurious effect whatever on the tree itself. Once I have seen, in Southern California, a large part of the crop quite ruined by frost, while the trees themselves showed hardly a trace of its effect.

Remember this fact, that your climate must not only be free enough from frost to grow the orange tree, but it must also not be cold enough to freeze the fruit. One night in a winter will do it. Do not plant orange trees where ice half an inch thick is known, as a general rule, to form once in a winter. Besides having a location secure from liability to freezing cold, you must select one that enjoys a sufficient degree of heat. The climate of California in the neighborhood of the coast is for this reason unsuitable for orange culture. Water is an essential that I do not think can be dispensed with anywhere in this State in cultivating the orange for profit. Without it you may be able to get some kind of a tree and perhaps some fruit of some kind, but you will, in my judgment, never pay the expenses of working your grove.

Remember that the orange tree, with its dense foliage and heavy crop of fruit which it requires almost the whole year to mature, is constantly drawing heavily on the soil for water. In spring you will find the soil of a deciduous orchard full of moisture containing all, or nearly all, that has fallen during the winter; but in the orange grove a great part of the rainfall at a corresponding time has already been drawn upon by the tree.

The deciduous tree ripens its fruit in comparatively a short season, most kinds before the hottest summer weather. In August and September the orange is drawing most heavily upon the soil to supply the water it must have to develop the fruit. Many localities in Southern California produce the finest crops of deciduous fruits and of grapes without irrigation, and this on dry mesa lands. But nowhere that I know of can a profitable crop of oranges be grown without irrigation. How much water is needed is a question whose answer must indeed vary as to conditions of soil, rainfall, etc. For a bearing orchard I should place the safe minimum of supply at one inch per ten acres; this where there is an annual rainfall of fifteen inches or more and your soil is not of too porous a character. I should place the *necessary* maximum at not less than one inch to five acres; this where the annual rainfall is under ten inches and in the hot, dry air, remote from the coast.

In speaking of an inch, the quantity produced by a stream flowing constantly through an aperture one inch square for the three hundred and sixty-five days of the year, under a mean pressure of four inches, is meant. But it must be borne in mind that this water cannot be used pro rata through the year, but that almost all of it will be required in the six months from April first to October first. If you have not reservoirs to store up the waste winter flow, the figures I have given should be doubled. Successful orange growing requires intelligent and constant care and watchfulness. The introduction of insect pests must be guarded against. If you obtain your young trees otherwise than by growing them yourself, take care that you do not buy with them the red or cottony cushion scale. If you should discover either of these pests in your orchard, confined to a few trees, use no half-way measures, but burn the infected trees where they stand. If either of these scales becomes scattered through the orchard, you must then make up your mind to wage a systematic warfare upon them. By spraying your trees three times a year you will be able to keep them well in subjection; but, so far as present experience goes to show, you can hardly hope to exterminate them.

A treatise in itself can be written upon the marketing and packing of oranges.

The same general rules will apply as to packing as with other fruits. There should be absolute uniformity in a package, as to size and quality; neatness and taste should be consulted, and great care taken to avoid bruising of the fruit in all stages of handling.

The orange should be *clipped* from the tree, *not cut*, the stem being divided close to the fruit.

It is generally conceded that a drying of the skin, to some extent, is to be effected before packing.

This may be accomplished by laying the fruit in shallow layers, not more than two or three deep, in bins prepared for the purpose in the packing house. It is best to wrap each separate orange; essential to do this for eastern shipment. As bearing upon the great care necessary in picking and packing, I make the following extract from the report of April, 1885, of Consular Agent Viale, of Mentone. Speaking of the lemon culture in that place, he says:

> One can scarcely form an idea of the care necessary in picking and handling the lemons, and in packing them for exportation. Formerly one half the population of Mentone were thus employed. The merchants had their chosen laborers of much experience to gather the fruit, make the boxes, and do the packing. Since this pretty village has become a winter resort, the habits of the villagers in respect to their work and their ways have changed greatly. The picturesque "capellina," which shaded the face of the young Mentonaise, has been replaced by fashionable hats, veils, and parasols from Paris. The young men have become *valets, chefs de cuisine, waiters*, etc., and thus the cultivation of the lemon is left to strange and ignorant laborers. This has lost to Mentone its export to the United States—*for fruit badly gathered, or poorly packed, arrives at its destination in a* PITIABLE STATE.

The boxes should be packed in the car in such a manner as to allow free circulation of air. The packages may be arranged in tiers, with spaces of about two inches between, running through the length of the car. Across the ends of each horizontal row, nail a piece of stripping (nailing to each box), to hold the boxes from slipping out of place.

In winter, as an extra precaution against frost, the sides of the fruit cars may be lined with thick paper, and arrangements ought to be made by the railroad officials to open the ventilators whenever there is no danger of freezing.

I may safely say that three fourths of the loss in eastern shipments is caused by heating, as against one fourth by freezing; this in winter weather.

California oranges are now favorably known in all the principal markets of the Western, Southwestern, and Northwestern States; in those of all the Pacific Coast and British Columbia, and are rapidly making their way in the great eastern cities.

With the aid of a liberal policy on behalf of the railroads, which they have shown every indication of extending, we will soon have the whole of the United States and Canada as our market. The great part of this great territory is open to us to-day.

Our fruit is in demand; buyers are now in the field to secure the coming crop, and the indications point to the conclusion that every box of oranges in Southern California can be disposed of at home, on the trees, by the grove, at good prices.

Special causes operate this year, it is true, to bring this about; the partial failure of the Florida crop, etc., and a medium crop at home, principally. In future years, as production increases, it is possible that we may have a sharp contest with the importers already uneasy at the inroads made upon their business. So far they are in the rear of the race, and I have no doubt at all but that they will have to fall back further and further.

There were imported at the Port of New York from the Mediterranean in the year 1885 eight hundred and twenty-seven thousand seven hundred and seventy-one boxes and cases of oranges, say one million boxes (a case is two boxes), and nine hundred and seventy-three thousand one hundred and eighty-nine boxes of lemons; a falling off of about one hundred and fifty thousand boxes of oranges, and of three hundred and forty-three thousand six hundred and seventy-four boxes of lemons, as compared with 1884.

The figures for 1886 are not yet compiled, but will show a still larger reduction in oranges.

The total annual importations from the Mediterranean in 1885 of oranges probably reached about two million boxes, and of lemons about the same figures.

From the West Indies and Central and South America there were imported at New York, in the same year, some two hundred thousand boxes of oranges—say four hundred thousand for all ports, making a total importation of oranges of about two million five hundred thousand boxes, or eight thousand two hundred and fifty carloads of three hundred boxes each.

There perished on the voyage of the New York importations of oranges from the Mediterranean 15 per cent; of lemons, only 2½ per cent. The percentage of loss on importations at New Orleans was heavier. Of the oranges imported at New York, from the West Indies, an average of 30 per cent perished in transit.

The courtesy of the Southern Pacific Railroad enables me to give the following figures for shipments of California citrus fruits in 1884 and 1885:

In 1884, fifty-nine through cars, in round numbers, passed over their road, bound to Northern California. In 1885 thirty-nine cars. Presumably, these were all lemons, and the falling off in 1885 would indicate the increase in the home consumption of home lemons.

In 1884 the through east bound shipments from Northern California were not kept. From Southern California they amounted to forty-three cars.

In 1885 the through east bound shipments from Northern California were two cars. From Southern California one thousand one hundred and twenty cars. In 1884 accounts of local shipments were not kept.

In 1885 they amounted, from Northern California, to forty-four cars (probably in most part redistributions of southern fruit reshipped for local distribution), and from Southern California to one thousand six hundred and eighty-five cars.

This makes the total crop of oranges and lemons of California, for 1885, about two thousand eight hundred cars, allowing for some fifty cars as duplicate shipments. How many of these were lemons I cannot say; perhaps four hundred or five hundred, leaving, say, two thousand three hundred cars of oranges. The crop of 1886 is not fully reported, but is supposed to have been about two thousand six hundred cars of oranges alone. The coming crop will not vary greatly from the same figures.

It will be seen there is quite a margin yet to fill before we can supply the eight thousand two hundred and fifty cars of imported fruit consumed in 1885, in addition to all home supply. Moreover, the consumption is constantly on the increase.

I have not attempted to discuss lemon culture in this paper, but cannot forbear calling attention to the fact that that branch of citrus culture, though promising fully as good returns as that of the orange, has hitherto been, comparatively speaking, entirely neglected. Our Lisbon and Eureka lemons are excelled by none in the world.

Lemons should be budded on orange stock. Lemon stock is subject to disease, and not long-lived in this State. In the issue of the "Rural Press" of October twenty-third there is a letter from Mr. H. Weinstock, on "California fruit at the East," which should be read by every fruit grower in this State. It contains, with other interesting matter, a detailed account of the method pursued in New York of disposing of the great quantities of Mediterranean oranges, lemons, and other fruits imported there. (The same method is pursued at Boston and New Orleans.) Mr. Weinstock's conclusions are very much in accord with those arrived at by Dr. Chubb and myself as the result of our observations when in the East last winter as agents of the Orange Growers' Protective Union. The Directors of that organization have already discussed the auction plan. For the present its adoption is not necessary as to oranges. Should it be hereafter adopted, it is to be hoped that the business can be kept entirely at home, and the sales held here in California, where buyers can be represented, if not in person, by their brokers, as is now to a great extent the case at the fruit sales in New York, New Orleans, and Boston. All will then have the advantage of equal freights.

In conclusion, let me say that the outlook for citrus fruit culture has never been brighter in this State than to-day. The verdict of the World's Fair at New Orleans, awarding the palm over all competitors to the Golden State for the best oranges and lemons *from any State or any country*, as shown in the display from Riverside, has been indorsed and ratified by the practical test of the eastern market, one prejudiced against us and in which we have had to meet strong adverse influences. This verdict, impartially given and thus upheld, will never be reversed.

RIVERSIDE, November 1, 1886.

DISCUSSION.

MR. HATCH, of Solano: It seems to me that this question of the growing of oranges should especially interest the people of this part of the country, as they surprised themselves last year, and intend to do it again at the Citrus Fair next month; doing so much better than they supposed was possible for them to do, they waked up to the fact that it was possible for them to produce oranges in this and in many parts of Northern California.

Mr. Wilcox, of Santa Clara: It is true the California orange was exhibited at the World's Fair, and there took the highest premium; but it is not strictly true that the orange will not grow north of a certain thermal line. I recollect of reading in the history of the sugar cane nearly thirty years ago, in "Harper's," the statement that the sugar cane grown on the Mississippi River was taken there from the West Indies. There is no doubt that a tree grown in a very hot climate, where the weather is extremely warm, will suffer greatly when it becomes extremely cold; yet I believe the orange will grow north of Riverside. In Los Gatos, in my county, you can see the orange tree and the oak shake hands across the street; oranges have been grown there for twenty years; you will see now on the trees some green, some ripe. I am bound, in a candid spirit, to say that there is something in this acclimating of trees; so that they may be grown further north than is stated. It is true that in Florida the cold destroyed their trees and the crop; that only proves that those trees had been accustomed to a very hot climate, though all the evidence we have got here in the last five or ten years shows that the orange bud will not freeze at the degree of temperature that it was formerly supposed it would.

Mr. Hatch: In reference to acclimating of trees it has been found that in planting there has been more success in a colder climate than in the climate from which the seed came; I have found that so in almonds. I take the seed and plant them and the trees that grow from those seeds are more sure to raise their crops than the parent tree; so might it work even with trees not deciduous that trees which grow from the seeds would stand more frost than the tree from which the seed was taken.

Mr. Milton Thomas, of Los Angeles: I do not think it is absolutely necessary, where there is good, strong, rich soil, to irrigate orange trees until they come to bearing. I refer to Dr. O. H. Congar, of Pasadena, who raises very fine oranges. On mesa land, some sixty feet to water, he did not irrigate his orchard for many years—he only irrigated a little, and for some four or five years he did not irrigate at all. About the time they commenced to bear, then he irrigated once or twice a year. I think the principal thing in orange culture is how to cultivate. I remember a man in Pasadena five or six years ago who planted his trees, plowed his land, and never irrigated at all, and the second year he obtained fruit from them; and I think if you plow deep and cultivate thoroughly they will need but very little irrigation until they commence to bear. It is the same with all other kinds of fruit. I am opposed to irrigation, although I have irrigated. The trees I planted last spring I do not irrigate at all. One thing I want to criticise in regard to the Riverside name of oranges. Suppose Sacramento, a few years ago, sent to Washington to obtain a few buds. You might just as well call it Sacramento, or Red Bluff, or any other place. The proper name for that orange is the Washington Navel, and that gentleman wants to tack on the name Riverside; I do not approve it, and do not believe there is one that does outside of that place.

Mr. Klee: I suppose that Mr. Bettner's remarks on the subject of irrigation of the orange were written from a Riverside standpoint. The rainfall varies so much all over the State that it is almost impossible to lay down any rule as to how much we shall irrigate. There is a fact well known to a good many, I think, that orange trees have been growing without irrigation in a number of places in this State. Your attention has been called to a certain orange orchard at Los Gatos. I think the one to which Mr.

Wilcox referred is the only one of any size in that section of the country. I have visited that orange orchard once or twice, and I know from my personal knowledge that it never received any irrigation until it came into bearing. Whether it has received any since or not I do not know. The trees are growing on rolling land, on rather a stiff soil, on some hills above Los Gatos. I think there is something like fifteen acres of them, and they have been thoroughly cultivated. The trees are good sized and very healthy in their appearance. I think that last year they bore quite a considerable of a crop, and, in fact, they must be considered quite a success for that section of the country.

IRRIGATION AND FERTILIZATION.

Mr. A. S. Chapman, of San Gabriel: On our ranch near San Gabriel we mix sheep manure and run it in with the water on our trees. There is considerable fall to our land and plenty of water, and the water is run into basins which are arranged around the trees, so that when the basins are full we have from six to twelve inches of water in them. As to cultivation, I do not plow all summer, but I plow in the winter and spring, after the growth is somewhat matured. I believe that Mr. Bettner made a slip of the pen when he wrote that he preferred to pick the orange, and not cut it. He intended to say, I believe, to stem-cut the orange, and not pick it.

Mr. Cooper: I should like to ask Mr. Chapman whether he thinks it necessary to irrigate.

Mr. Chapman: It is absolutely necessary to irrigate on our land; ours is gravelly soil. We could not begin to irrigate in the way that Mr. Bettner does—running water in a furrow; that would require less water, but he would find that a sufficient flow of water would wash the soil away, and a small stream would run right into the ground like a sieve; so it becomes necessary to irrigate with a large head of water. If our soil were very sandy, and I would run clear water on it, it is my idea that I would wash away plant food clear beyond the reach of the plant; so I think that the system that is pursued in Riverside would be detrimental.

Mr. Cooper: Do I understand you, that you make a sort of an emulsion of sheep manue and water?

Mr. Chapman: Yes, sir.

Mr. Cooper: You make a basin throughout the orchard?

Mr. Chapman: Every tree has its basin. The stream runs right in the middle of the rows, each way, and the basins are filled from this stream. Plowing as I do, I believe that a hardpan will never form. I have observed an orchard where they plow after every irrigation, and a hardpan has formed there, and I have seen an orchard next to it where the owner would let the weeds grow and plow only occasionally. There the trees are more healthy than where they took so much care to keep the orchard perfectly clean. This is a question that we have discussed at great length. My idea is that you have to supply the vegetable matter to the soil. It is a well known fact with soil that has been cultivated for several years that if you then wet it, it will run to rock; that is my idea of what produces a hardpan, and I know of no other reason.

Mr. B. M. Lelong, of Los Angeles: Mr. Chapman spoke of an orchard that is never cultivated as Mr. Bettner recommends, but where the weeds are allowed to grow for awhile. I know this to be a fact; two years ago it produced a larger crop than any in its neighborhood, and the reason is, that the land became better fertilized than any of the others. I know another orchard, next to Gov. Stoneman's, that produced absolutely nothing; the growth of the trees was checked; the result was that there was comparatively no vegetation whatever. Mr. Graves manured it heavily, and did so for four years. Last year the trees that once were stunted and small have made a very large growth, and there were about twenty-two hundred boxes taken off of six hundred trees. This year there were over five thousand boxes taken from those same trees, and it is now considered one of the healthiest orchards in San Gabriel Valley. One thing about Riverside—Riverside has a different kind of a soil; in one part it is hard, in other parts it is gravelly, and in other parts it is of a sandy loam; they run a furrow in it, the water flows down, and by the time that they get to the end the trees at the end get too much water; the others do not get enough. The plan adopted by Mr. Chapman at San Gabriel seems to work better, because each tree appears to get just so much; the water being conducted to this basin it gets so much, and with the fertilizers at the same time. Another thing, the water will also carry soil from the head of the orchard to the lower end. I know of one instance in this Graves orchard in San Gabriel where the trees were buried at the lower end four feet; when this was stopped it was necessary to clear away this soil from under the tree; because they were buried with soil they would not grow; they were stunted, and those trees are the only ones that show any difference in appearance. Now, you plant a small orchard; for four or five years it grows very nicely; the roots seem to be very healthy, and it takes up only so much moisture from the ground; it does not require so much fertilization nor so much irrigation; but when it grows up these roots get up into a solid mass and you can plow only within four feet to the tree, to avoid plowing them up; these roots feed the tree and should not be disturbed. At Riverside, in some places, they trim the trees very high and plow very close to the trunk of the tree; that cuts considerable of these little fibrous roots, and the tree loses strength in a short time by taking them away. In many orchards in San Gabriel they leave the limbs come down close to the ground. After irrigating them in basins the tree gets only as much water as the basin holds; a common potato fork is used instead of a hoe. The trees are never plowed near the trunk (no, not nearer than four feet); in this way they require less irrigation; the limbs reaching down close to the ground keep the soil moist and they require less irrigation and look better than many others there. Where they plow near the tree and the limbs run up high the sun bakes the ground, the roots will plow up and the tree suffers, and wherever an orchard is raised in that way you will see yellow trees.

Gen. M. G. Vallejo, of Sonoma: Nearly fifty years ago I planted in the Sonoma Valley the first trees that were raised in this State, from seeds that were brought from Acapulco, and succeeded in getting about fifteen or twenty trees. I planted them at my residence near the old plaza. For four years they were very small; I then transplanted them. At nine years old the trunk was about three inches thick and they commenced to bear nice and very sweet fruit; I do not say better than from other localities, but very fine oranges, for which I have had premiums awarded at fairs in Marysville, San José, Sonoma Valley, and San Francisco. For nine years the trees growing slowly, the main root grew deep and several branches quite thick like wood, but after nine years they began to create a kind of a blanket of roots, which was very thick. Before that you do not need any irrigation. After they begin to get so very thick it is necessary to dig and clean away and cut out that mass of small roots, and then you begin to put some water there. I have had experience for years; I have some two hundred or three hundred trees that I planted for experiment so as to get an idea of what we can grow in this section of the country. In our localities here in the north our climate is good enough in general, but not so even as San Diego and the more tropical regions where they make a business of oranges. I think it would be better for us to let them have their oranges there, and plant other kinds of trees.

MR. SHINN: The claim has been and is made by the growers in the northern part of the State that they cannot grow the citrus fruits, as it is said it would not do to attempt to grow oranges where there may be ice once during the winter half an inch thick. I suspect, as Mr. Wilcox said, that the general climate of a country has much to do with that question. We know that in Florida last year, and about every ten or fifteen years, they have a very severe winter, with ice half an inch thick, or perhaps more, that destroys the trees almost entirely. That is probably because during the remainder of the year the climate is so warm that the tree is too tender and not prepared to resist a frost. In Alameda County, where I reside, some fifteen years ago I planted some orange trees. They were from Tahiti, and after they grew to be several years of age some of them were grafted and budded with several varieties from Riverside, Washington Navel as well as others, and they have been exposed to all the frost we have had there. The location is some three or four miles from San Francisco Bay, and about thirty miles from that city, and at an elevation of not more than fifteen or twenty feet above the bay. The frost has never injured them; they would be green and bright all along, and many of them have borne fruit for four or five years, yet I have seen frost and ice in my water troughs a good deal nearer an inch than a half an inch more than one winter. I suspect that where trees grow in a climate that is not so extremely warm all the year round they are better prepared to stand more frost in winter. I had one year some seedling orange trees that were growing very rapidly and grew very thick, and we had a very sudden frost, and while it did not affect the other trees I have been speaking of, it cut the tops off of these seedling trees, I think because they had a very rapid growth.

MR. LELONG: I want to say one word more. Some people take and cultivate trees, irrigate them, and keep on irrigating them all through the fall, but very little is done through the spring and summer. In that way the tree is forced out in the fall, and the wood of the new growth is too tender to undergo a cold spell in winter. Mr. Bettner refers to several varieties, which he recommends to be planted. I have been well posted in regard to varieties, and know those that stood the highest test, and those that took the best in the market and stand transportation. I would not recommend anything more than the Washington Navel (there is no such thing as the Riverside Navel) and the Valencia, late, which is considered next to the Washington Navel. This tree does not come into bearing as soon as the Washington Navel. So much in its favor; as the trees get to some size before commencing to fruit. It is the latest variety, ripening when all others are out of the market. The Malta Blood is a good orange for market; the trees do not grow large; a prolific bearer. The Wolfskill seedling is the best of native varieties. The Satsuma is new, ripens in November; there is danger of getting too many varieties in an orchard. The Tangerine, you know; the Mediterranean Sweet, I would not plant them myself, nor would I advise them to be planted. They are dwarfs—if a person wants a dwarf, they are the trees to plant.

MR. PECK, of Placer County: In regard to this question of irrigation, I think it all depends upon location and soil, and while we may learn from each other, we have got to depend upon our own judgment and experience in growing oranges, as well as all other kinds of trees. The first orange that ever ripened in Placer County, ripened upon my place; I planted the seed in the fall of 1861, never expecting to hear from it again. I gathered fruit from it in 1872, and every year since; it has had plenty of irrigation, and the frost has never harmed that tree yet. I have never protected them from the frost, in Placer County.

Mr. W. H. Aiken, of Santa Clara County: There is one matter in connection with orange growing that I have some knowledge of. The orange orchard at Los Gatos, in Santa Clara County, is very peculiarly situated; it is in the mouth of a cañon where the air never rests; there is a continual draft, and frost of course cannot settle at all. Very often, it is not the latitude nor the longitude, but it is the peculiar location which affects temperature. The characteristics of location, the soil, and the climate must be considered.

Mr. Hatch: The same rule which Mr. Aiken has just mentioned holds good in the beautiful South; I remember of being there three years ago last March, when in many localities they were digging up their lime hedges; their lemon trees had been killed by frost. In other special spots it was not so, and the lime trees were all right, their lemon trees were all right, and their orange trees, but in the majority of places in the beautiful sunny South that year their oranges were caught, and their lemon and lime trees were dying or dead.

Mr. Peck: I want to say a word about the frost. I came to California and lived for awhile in Los Angeles, that beautiful city, and in the month of December, 1855, I saw as thick ice in Los Angeles as I have ever seen in the town of Ophir, Placer County.

General Vallejo: The gentleman spoke a moment ago of Santa Cruz. I was born fifteen miles from Santa Cruz, and I have been in California seventy-nine years and have been in every locality from San Diego to Shasta. I have studied every ravine, every river, every lake, and I am familiar with the climate. I have had experience in my place in Sonoma over fifty years, and I tell you if you get good soil not exposed too much to the north wind, only sheltered a little bit, they grow everywhere. Perhaps on the flats they will not do very well where wind strikes them, but I have lemons on my little place equal to those they grow anywhere, and oranges as sweet as any.

Mr. Lelong: I do not believe that any of us deny that we have had frost in Los Angeles; but there are parts of Los Angeles County where there has never been frost. There is also a difference in the soil. There seems to be a difference at the lower part of the valley; for instance, at Duarte or San Gabriel, in Los Angeles County, there is no frost, and then you see some frost down the valley toward Colton. It is the same way in the Santa Ana Valley. You see frost in some places every year. I have seen one orchard where the trees on one part of the orchard were planted on high ground, and the trees on another part of the orchard, planted on lower ground. Those on lower ground are subject to frost mostly every year, and so throughout the county. In reference to protecting the trees from frost, I believe that it is essential to treat the trees so that they will stand throughout the winter. They should be cultivated in early spring and summer, and preparations for winter should begin in the fall. I remember when this was done some years ago, and I may yet see the orange growers adopt that plan. A wind, or cold spell, that will cause the leaves to drop in winter, will cause the limbs to die back.

Mr. G. M. Gray: I do not know anything about raising oranges, but I want some one to say a word for Oroville; there they are raising very fine oranges with very little irrigation; they are on high ground and not troubled with frost, and, as the last speaker said, the frost settles on the lower ground.

Mr. Williamson, of Sacramento: The facts stated by Mr. Hatch are true—that there are certain parts of Los Angeles where it is unsafe to grow them, and there are other places where it is quite safe to grow them. As to Oroville, I do not live there, though I have been there frequently, and I have been all over the southern counties and at Riverside, and I have never seen a grander success or finer oranges than I have seen at Oroville. So in Placer County and all our foothills here for a distance of three hundred miles, at an altitude of six hundred to one thousand two hundred feet, oranges can be grown successfully on the right land. As to irrigation, I have had little experience with the orange tree, but I know at our orange orchard, at Penryn, I have killed some trees by irrigating them too much, and I tried others without irrigation. I find my experience is that an orange tree wants a deep, loose, rich, kind soil, and if you want to get the best results you want to give it a moderate amount of moisture, but not too much. As to the name, I understand that there are two Navel oranges cultivated in this State; one came from Australia, afterward another came from the City of Washington, sent out here by the Department of Agriculture; hence the name Washington Navel, and that one coming from Washington is the superior of the two in quality and size, and bears larger crops than the other.

SECOND DAY'S PROCEEDINGS.

Sacramento, November 16, 1886.

The convention met pursuant to adjournment, **President Cooper** in the chair. The minutes of the previous session were read and approved.

The Chairman announced the report of the Committee on Modification of the Programme, which made slight changes in the programme as already set forth.

THE MOST INEXPENSIVE REMEDIES TO APPLY FOR THE DESTRUCTION OF INSECT PESTS, HOW TO APPLY, THE TIME TO APPLY, AND THE COST.

Mr. W. G. Klee presented the following papers on "Scale Insects" and "The Codlin Moth."

THE CODLIN MOTH.

In the estimation of many fruit growers, this pernicious trouble is the worst pest ever introduced into the State. To my knowledge, it exists in nearly all the northern counties, and, with the exception of Ventura, in all from Sacramento to the last southern county. In several sections of these counties it has, however, not yet been found; for instance, at Carpenteria, in Santa Barbara, where I made diligent search for the least sign of it, but failed to see anything of the kind. Some years ago, in the same locality, I understand that Mr. Cooke also failed to find any. It is rather remarkable that it should not have reached here yet, as the people do not appear to be over careful as regards the danger of spreading the insect pest. At Carpenteria I found a theory advanced which was to account for the absence of the codlin moth. They claim that the coal oil odor, quite penetrating at times, kills the moth. This theory might be applied to Ventura County, but it is advisable that no one put any faith or reliance in this theory. In my opinion, the absence is due simply to the fact that no boxes containing the moth have yet been brought there, and the people, appreciating their present good fortune in that respect, should take all precaution in future against the importation of this obnoxious merchandise.

The work of the codlin moth is too conspicuous and too well known to need any description, and so we may pass directly to the discussion of the remedies, of which there are many offered, but none so far tried have proved quite satisfactory, although it must be admitted that several are quite promising—so promising that I believe we may say we are on the road to success.

The different modes by which people have tried to repress the codlin moth may be divided in the following manner:

1. Those aiming at killing the young larvæ while in the fruit.
2. Those aiming at destroying the mature larvæ.
3. Those aiming at destroying the moth.
4. Those aiming at destroying the hibernating cocoons.

Measures to Kill Young Larvæ While in the Fruit.

Sprayings.—This mode of protection is evidently the most promising of any, and, in the East, where it has been tried for a number of years, it has given quite satisfactory results. Of these solutions, the arsenic compounds have been the preferable. The experiments of Professor S. A. Forbes, of Champain, were condensed and published in the "Country Gentleman" some time ago. His experiments were with Paris green, London purple, and lime. Of these, only the Paris green can be said to have accomplished anything remarkable. Lime dissolved in water proved worthless; London purple saved 10 per cent of those that otherwise would have been wormy. Trees sprayed with Paris green produced apples of which 75 per cent were sound, while those not sprayed had but 21 per cent sound. These trees were sprayed eight times with the mixture, much more often than Professor Forbes considers necessary. The last spraying was made early in September, two months later than the common practice. After this a two days' rainstorm occurred. Immediately afterward a large number of apples were gathered and subjected to a careful chemical analysis, when some arsenic was found adhering to them, and to such an amount that seventy-five apples would convey a poisonous dose. Professor Cook, of the Michigan Agricultural College, has reached more definite results, and seems positive as regards absence of danger in using Paris green, and also as regards the efficiency of London purple. We quote from him here:

> *Spraying with the arsenites.*—By far the best remedy for this codlin moth is to use either London purple or Paris green. The remedy is not only very efficient, but is also easy of application, and not expensive. I have now tried this thoroughly for six years, and in each and every case have been more than pleased with its excellence. Enterprising fruit growers of New York, Michigan, and other States have also tried it, and are as loud in its praise as I am. Indeed, I know of no one who has tried it in vain.
>
> I have found London purple just as effective as Paris green, and as it is cheaper, and rather easier to mix with water, is to be preferred. I mix the powder one pound to fifty gallons of water. It is better to wet the powder thoroughly, and make a paste, before putting it into the vessel of water, that it may all mix and not form lumps. One common pail of the liquid will suffice for the largest tree. A teaspoonful of the poison is enough for a pailful of water. The spray may be caused by a fine perforated nozzle or a cyclone nozzle. The finer it is, the less liquid will be required. *The important thing is to scatter the*

spray on all the fruit, and get just as little on as possible. The larva is killed by eating the poison, and we find that the faintest trace suffices for the purpose. Again, the poison should be applied early—by the time the fruit is the size of a small pea. I have found one such application to work wonders. There is no doubt but that the first application, followed by one or two others at intervals of two or three weeks, would be more thorough; yet I have found one application, made early, so effective that I have wondered whether it is best or necessary to make more than one application. I do think, however, that it must be early. In May and June, the calyx of the apple is up, and so the poison is retained sufficiently long to kill most of the insects.

The danger from this practice I have proved to be nothing at all. The microscope and chemical analysis have both shown that all the poison has been removed long before we wish to eat the fruit. The wind, no less than the rain, helps to effect this removal, as I have shown, by putting the poison on trees sheltered from all rains.

These experiences of persons in the East, cited here, are most valuable; but we must not forget that our climate differs in many respects, particularly as regards rain in summer, and very much in their favor is the shorter season, east of the Rocky Mountains, as there at the most are but two broods in the season. If our spraying is to accomplish good results, we must use at least two or three, and when surrounded by infested orchards, judging from trials made here, this number of sprayings is absolutely necessary.

Californian Experiments.

Arsenious acid or white arsenic dissolved in potash.—This remedy is now used less in the Eastern States than Paris green or London purple; but if we can manage to apply it to the trees without doing them injury, it is undoubtedly the safest remedy, as regards the danger of poisoning those who may eat the fruit sprayed with it. Investigation has proved conclusively that it is perfectly safe. This safety is due partially to its being less poisonous, compared with Paris green, and partially to its being extremely soluble in water; this latter quality causing moisture however slight to carry it off. It is chiefly on account of this latter property that it is objected to in the East, where rains prevail all summer.

One objection yet remains, and that is, unless used under certain conditions so as not to allow too rapid evaporation, it is liable to seriously damage fruit and foliage. The remedy was tried by various people in Santa Clara Valley, where I have investigated its effects. Mr. C. T. Settle has an orchard of young apple trees, just in their prime, situated in the district near San José, familiarly known as "The Willows." Part of his trees were sprayed with white arsenic, dissolved in potash at the rate of one pound of arsenic to two hundred gallons of water, and also at the rate of one pound to three hundred gallons. Little difference can be seen between the effects of these two. The trees were drenched with the compound. The work was done at evening, before clear days, at the end of May, about the time the fruit had just been formed. The effect on the foliage was most disastrous, causing it to fall, and with it most of the fruit. Some varieties suffered more than others—Yellow Bellflowers apparently the most, White Winter Pearmain the least. In June, when I saw the trees, they were rapidly recovering their foliage. During the subsequent visit in August I found the fruit that had remained on the sprayed trees, as compared with that of the unsprayed trees, but little affected by the codlin moth. At my request Mr. Settle forwarded a box of apples to Professor Hilgard for chemical analysis. Out of eighteen apples treated to a thorough washing of potash solution, no trace of arsenic could be found.

Mr. G. W. Ousley, a neighbor of Mr. Settle, sprayed with the same solution, first in the spring, at the same time as Mr. Settle did, and then five weeks later. His results were far more satisfactory. Although the foliage was damaged to some extent, all the fruit was saved. The reason of his success was due to his not using as much of the compound as Mr. Settle did; also, due to his aiming chiefly at the fruit. The damage to the leaves consisted chiefly in the burning of the edges. But few of the leaves themselves fell. On my request, Mr. Ousley forwarded to me some of the apples that had been twice sprayed. A similar analysis, made also by Professor Hilgard, failed to reveal any trace of arsenic.

As regards the success as a preventive against the moth, Mr. Ousley writes me that, of the trees sprayed, 50 per cent of sound fruit was harvested, while of those not sprayed, nearly all the fruit was wormy.

Thus far, we have seen that the arsenic was partially hurtful to the foliage. An interesting experiment, when this was not the case, was brought to my notice by Mr. Ousley on a neighbor's place. Here, several trees have been sprayed with exactly the same solution as that used by Mr. Settle and Mr. Ousley, but it was applied in the morning of a cloudy day; but the others were made in the evening, the day following being bright, this first named experiment doing no damage to the foliage. It will be seen, therefore, that in these sprayings we may find a remedy which, applied often enough and at the right time, will prove an effective remedy.

In the report of the Department of Agriculture at Washington, Professor Riley gives the proportions in which arsenic has been used for the purpose of killing various insects:

> Fifty grains of arsenate of soda and two hundred grains of dextrine, dissolved in one gallon of water; this diluted at the rate of about an ounce to ten gallons.
>
> One pound of arsenic and one pound of sal-soda, boiled in one gallon of water until the arsenic is dissolved, at the rate of one quart to forty gallons of water.

Paris Green.

Paris green is a compound of arsenic and copper. It is a far more powerful poison than arsenic alone, and is not soluble in water, hence will remain much longer on the trees. As stated before, in the Eastern States it is used in preference to arsenic, as it is not so liable to be washed off by rain; and another advantage is that it will not hurt the foliage.

We regret that we have not been able to reach any definite proof of its efficacy in this State—nothing except the statements of the Kennedy Brothers, of Los Gatos, who claim to have used it on Bartlett pears to great advantage last season. The proportion they used, as given to me, was eight and a half tablespoonfuls of Paris green to one and a half pounds bar soap, dissolved in forty gallons of water.

At the October meeting of the State Horticultural Society, Judge Blackwood, of Haywards, made the statement that he had used it the previous season with great success.

Mr. Webster Treat, of the Oakshade orchards, also used Paris green and London purple; but having used whale-oil soap and sulphur washes, it is difficult to say how much of the success can be attributed to this compound. However, in a letter to me, he writes very encouragingly about the arsenic compound, and yet admits that it has not been thoroughly satisfactory, but thinks many frequent doses will do the work. We regret being unable to secure for analysis any of his much-sprayed fruit. Before we wrote to him it had all been disposed of.

London Purple.

London purple is another arsenical compound. It is the residue from the manufacture of aniline dyes, and contains lime, arsenious acid, and carbonaceous matter. It is more soluble, more adhesive, less poisonous, and less expensive than Paris green. It costs 5 cents, where Paris green costs 12 cents. With the exception of Mr. Treat, I am not aware of any one who has used it this year.

Whale-Oil Soap and Sulphide of Soda.

In this compound, recommended by myself as a summer wash, I have considerable faith. The wash is very simple, and comparatively easily prepared. Dissolve thirty pounds of whale-oil soap (80 per cent soap, at the most costing 5 cents per pound), in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye is what we have used) with six pounds of sulphur and a couple of gallons of water. When thoroughly dissolved it is a dark brown liquid (chemically, sulphide of soda). Mix the two—the soap and the sulphide of soda—well, and allow them to boil for about half an hour; then add about ninety gallons of water to the mixture, and it is ready for use. Apply it warm, at about 130° Fahrenheit, by means of a spray pump. Used warm, its effect is better, and less material is required than when cold.

It was used last spring at the University grounds as a summer wash, and the first brood of codlin moths was very small. It was not used more than once, and its effects could not be expected to last more than five weeks. The later fruit was considerably infested.

Sulphur.

In a report of a horticultural institution in Germany—Geisenheim-on-the-Rhine (R. Goethe, Director)—we find record of partial success, obtained by scattering sulphur a number of times on the fruit.

Measures to Catch the Larvæ.

Banding system.—This mode of protection, which has been practiced in the Eastern States, has been tried in this State more than any other. Its usefulness is based on the observed habit of the larvæ when leaving the apple to seek shelter under the bark. The band about the tree provides artificial shelter for the worm, and the majority of the larvæ, no doubt, find their way to this; but a sufficient number for giving future trouble find other hiding places on fences, buildings, etc., and perhaps more than anywhere else under clods at the foot of the tree; and it is here, in an old orchard, that I have almost invariably found cocoons. To make the banding system more effective, the ground right around the tree, as well as the whole orchard, should be thoroughly pulverized. The greatest obstacle to the success of the banding system is the neglect of one orchard owner, while his neighbor conscientiously and thoroughly performs the work. The neglect or half-done work of one person among his trees is sufficient to counterbalance the attentive and thorough work of many others around him. The difficulty, in so many cases, of doing anything really satisfactory, I think, is due to this want of coöperation. In my own orchard, in the Santa Cruz Mountains, comparatively isolated, very fair results have been obtained. It is evident that in a thickly settled community, unless all concerned do their duty, the work will be largely in vain.

Picking off Infested Fruit.

The practice of picking off infested fruit, of course, comes under the same head as the band system. In that it aims at a reduction or extermination of the next brood, it should go hand in hand with the band system. It is also open to the objection that unless the neighbors do their duty little good is accomplished.

Thissell's Trap.

The so called moth trap, invented by Mr. Thissell, of Winters, is founded on the same idea as the band, but is arranged so that when the moth hatches it remains in the trap. This trap consists of a collar of tin, to which a piece of wire cloth is attached. The collar is in the middle, so as to hold the wire away from the tree. A piece of sack is placed around the tree. The wire cloth is gathered above and below the collar and fastened closely to the tree with tacks. The meshes are just large enough for the larvæ to enter. To make allowance for the larvæ above the average size, the tin collar at the middle is perforated with holes slightly larger than the wire meshes. The moth when hatched cannot possibly escape, but remains to die in the trap. The trial I have seen was very satisfactory—all the larvæ placed on the trunk finding their way directly into the trap. It will be seen that this trap saves all the work of searching the bands, which in itself amounts to a great deal. The absolute necessity of looking at the bands at short intervals makes the system extremely annoying, as all other work of the time must be laid aside for this. On the other hand, Thissell's trap is rather expensive, being from 15 to 30 cents, according to the size of the tree. It has also the objection that it does not allow for the expansion of the tree, a fault quite serious when young trees are to be protected.

Measures Aiming at Destruction of the Moth.

Light to attract the moth.—This means, aiming at the destruction of the moth, has been least successful of all. From the testimony of the best observers, both here and in the East, we may conclude that the number of codlin moths caught and killed by light is very small, as compared with the number of other night-flying insects, many of which are useful. At Mr. Treat's orchard, the device—a lamp above a can of oily mixture—in my judgment has been no more successful than others on the same principle.

Cans filled with vinegar and molasses or other similar compounds.—This device, it seems to me, has been least successful of all, attracting all kinds of insects but the ones most of all desired. It must be regarded as a failure.

Remedies Aiming at the Destruction of the Hibernating Larvæ.

To prevent any larvæ from hibernating on trees, all old loose bark should be scraped off and the ground treated to a depth of six inches below the surface. If the trees are covered with lichens, which is very often the case, the spraying of the trees with an alkaline wash will be of excellent service, killing any that might be there, and also invigorating the tree. If potash be used, one seventh of a pound of concentrated lye and one quarter of a pound of potash to one gallon of water is a good mixture.

Finally, summing up the subject of the means aiming at the extermination of the codlin moth, the band system, coupled with washes of the nature indicated in the preceding, seems to be the best to be relied upon the coming season. It will be my object to determine definitely what can be accomplished in this direction. I think we are now in the right way, and by the end of the next season we shall know quite definitely which of the above washes is the safest and most effective.

DISCUSSION.

Mr. Shinn: Is it at all certain that the London purple will reach all the apple blossoms? I suppose that is essential to the success of the remedy.

Mr. Klee: The results have been in the saving of from 75 to 80 per cent of the fruit; that is as near as they have got. They may get nearer to it by keeping it up, but that is as much as we know that it will do. Now, as to Mr. Gray's question, as to whether the pernicious scale will live in the hot valleys, I think that can be answered affirmatively. I think there is more than one present here in the room who can testify that it will in almost every locality; in fact, I think it will live in any locality on the coast; it will live in the driest climate. Now, there were several important points brought up by Mr. Runyon. In the first place, the trees can be hurt or destroyed by the potash and soda lye; I have known of their being hurt myself; but those trees had already buds partly swelled, and every one who uses this wash must ascertain beforehand in what state the trees are. They must be as dormant as you can get them in this country, and then I have never seen it do any harm to the young fruit buds. It may sometimes be difficult, and especially in a large orchard, to find trees perfectly dormant; and there comes in great vigilance, and that vigilance cannot be insisted upon too much. While I claim that we have the remedy, it is only by eternal vigilance and by coöperation that we can accomplish the result.

The Monkey Test for Arsenic.

Mr. Block: It has been stated here that the effects of the poison have not been sufficiently demonstrated. Mr. Settle had been washing his trees with one pound of arsenic to two hundred gallons of water. A neighbor of his had a monkey that had the run of the place. The second day after he washed he and his neighbor saw the monkey go into the apple trees and take off an apple. They concluded they would let the monkey analyze the effects of the arsenic, and they watched the proceedings. The monkey took the apple, and then he got through with it; whether it tasted better on account of the arsenic than otherwise or not, but he went back and got another one. They thought they would let the monkey have as many apples as he wanted, to see what the effect would be. The monkey ate the second apple, and it had no effect upon him. The result was that Mr. Settle was perfectly satisfied, and was willing to eat the rest of the apples. This thing encouraged me. I have always been opposed to the use of poisons against these insect pests. I took two or three trees and washed with London purple, using one pound to sixty gallons of water. The first tree I washed during the heat of the day, which I think is always injurious, even to wash with cold water without anything else. I find that in spraying it the skin of the apple contains oil; the oil repels it; it does not take the water and cover the entire surface. That wash has affected the leaves, and a good many of the leaves fell off. It scorched them, but it started off with another growth and saved a good crop of apples. To overcome that, so as to have the poison spread over the entire apple, I dissolved the poison in soap water; beat up the soap to make suds. I put that in the water and it covered the entire apple; and I would recommend wherever it is used to use some soap with it for the purpose of covering the entire apple. I do not believe that you can dissolve poison so that the fruit will be covered without the soap. I have seen very little difference between the two; the trees have matured a good crop. I have sprayed only once, rather late in the season. There has been some fruit that had the codlin moth, but the tree matured a good crop of perfect fruit. At the same time, on account of the loss of foliage, the apple was not as large as it otherwise would have been under ordinary circumstances. That is my experience. I do not think there is any danger connected with it.

Mr. Klee: One word in answer to Mr. Block. You will remember that Mr. Settle sprayed with white arsenic, which is a very different thing from Paris green; and it is the Paris green sprayed apple that I want to get analyzed—that is the compound which seems to have done the most good, and it is a very different compound, for it contained both copper and arsenic, and has a virulent poison—the arsenious acid. There is not any more than one apple that a person can stand as a medicinal dose. I figured that out one day and found that each apple would receive much more than a medicinal dose. As I stated before, after four months there was not a trace of arsenic left.

The President called for Mr. Matthew Cooke, but that gentleman had not yet arrived. The President then said, in reading this morning's paper, I discovered that his Excellency Governor Stoneman has appointed Mr. B. M. Lelong, of Los Angeles, a member of the State Board of Horticulture, vice the Hon. A. F. Coronel, who has resigned. It affords me great pleasure to welcome him to the Board, and in the absence of Mr. Cooke I will now call on Mr. Lelong for a few remarks on the cottony cushion or white scale.

Mr. Lelong: Mr. President, Los Angeles County has been very badly affected by an insect that is known all through the State, and has been named the cottony cushion scale, although it is not so known in the Eastern States; it is known as the white scale, the *Icerya purchasi*. The extent which it has covered in Los Angeles is considerable. There were some trees imported there a number of years ago which were planted in one of the largest orchards in Los Angeles—little or nothing was done to exterminate them then—and from those trees they infected others, and from those others they infected a great many orchards in the city. There was one plant taken from a nursery to San Gabriel Valley, and from there it infected other trees. The fruit growers became alarmed, organized an association, levied a tax upon themselves to exterminate it, if possible, out of the valley; but that seemed to be impossible. The authorities, on their part, were all right, and their aim was to exterminate it if possible, without regard to expense. But there are very peculiar people in every part of the State, and some objected to having their trees treated unless they were paid for them; and when an arrangement was made with them, they again denied admittance, stating that their price for the crops would be in the neighborhood of $3,000 a year, and they wanted about three years paid in advance. This was too much for the fruit growers, and they determined to prosecute them by law. Then this law was spoken of, attorneys were employed, and an opinion was given by them, but it took time; no less than six months were wasted in that way, and the insect gaining all the time. It is now over considerable of San Gabriel Valley, and has been found beyond that.

The county afterwards appointed a commission under the State law; these Commissioners were also appointed by the State Board of Horticulture as quarantine guardians. The city also appointed about six or eight Inspectors, and they had been going around and inspecting orchards, and whenever insects are found and infected trees, a written notice is given to the party to clean his trees within such a number of days, and if such disinfection is not made, they are arrested and prosecuted. There have been several prosecutions made, and in that way it has cost the city and county in the neighborhood of $20,000. I believe that we should fully discuss, under this head, the proper laws. I think we should have a different law, for the one now existing seems to be ineffective and inadequate to our wants. Mr. Klee, I believe, in fact, informed us in Los Angeles that there was nowhere in the State where this law was tested, and the Board of Supervisors of Los Angeles County are now getting ready to test the law. There are different methods of treating the trees, but none of them so far can be termed exterminative. Mr. Craw, in our county, has been experimenting considerable with fumigation, and he, together with Mr. Coquillitte, have found that by covering the tree with a tent, using gases for fumigating, that more insects can be reached than by the spray. Bisulphate of carbon seems to take hold, but it burns the top of the tree, wherever the tent touches it, and it also seems to affect the fruit. Wherever the tent rests on the limbs there the leaves seem to be burned; however, it kills the insect, but does not seem to kill all. They have, however, a gas unknown to me, by the use of which in less than fifteen minutes everything on the tree seems to be killed; it is only a question of time. It will take all winter, perhaps until next spring, to find out what the full effect will be on the tree and on the fruit. They expected to reach this point soon. The apparatus used for spraying are in great number, but those more preferable are the Excelsior Hooker Pump No. 1; No. 2 has more power, but it takes more power to work it. Last year the Commissioners recommended spraying with long rods. That, at that time, was the only thing we had to spray with, and spray from the ground, and a great many leaves remained untouched, where in the upper part of the tree they pointed upward and only the sides were wet, but by taking a ladder and small rod you can get right on top of the tree and wet downwards, and by that you can get at every part of the tree. One thing in regard to the name of this insect; some give it one name and others another. I referred this matter to Professor Ira More, who is the Principal of the Normal School in Los Angeles, and in reply he sent the following:

Los Angeles, November 1, 1886.

B. M. Lelong, *Esq.*:

Dear Sir: I am sorry not to be able to answer your question fully. The name *Icerya purchasi* is a name first appearing in the "Zoölogical Record," published at London in 1874, over the signature "Sign.," the abbreviated name of the naturalist who gave it. I cannot find the derivation of *Icerya;* it is not from the Latin or Greek, from which so many of them come. The second is probably the genitive of Purchas, the name of the one who discovered and described the animal. From the analogies of the other scientific names the pronunciation should be "Ī-cĕr′-ya pur′-chas-ī." I have taken Webster's marking.

Very truly yours,

IRA MORE.

Mr. Klee: I have been anxious to find the real home of this much spoken of *Icerya purchasi*, and wrote to Professor Comstock, and all he seemed to know about it was what was stated in the reports of the Agricultural Department at Washington; that it was named first by Mr. Maskell, in New Zealand, there being found on an acacia (kangaroo-acacia, so called), which is in Australia the name of acacia armata. The *Icerya* may likely have been brought from Australia to New Zealand with the acacia. I think we all would do a great service in finding out where this insect came from. Mr. Cooper told me last night that he had read in a paper from Australia many years ago that a certain insect existed in Australia which kept this *Icerya* down, and without that that it was a very dangerous pest; that we all know that it is here, and I think that every one who is interested in it—and you might say that everybody in the whole State is, for it is scattered over a very large portion of it—should look into it. There is hardly any tree that is exempt from it. Although our deciduous fruit trees are less subject to it, it will get on them, but it don't seem to make a living on them; and any one who has friends in Australia would confer a great favor on this country if they could find out something more definite about the true home of this insect. We know that it has spread through Africa, it is found in the Cape of Good Hope, and only the other day came a communication from there asking for information what to do about it, the man having heard that here in California they were quite successful in exterminating it. In going through the southern country I was very much pleased with the energy that the people in Los Angeles had shown in trying to exterminate it, but it is a huge task, and unless everybody helps, unless the people allow their premises to be searched, and do all they possibly can, it will perhaps never be quite exterminated; but enough has been done to prove that by thorough measures it can be kept down, and if people will go to the great sacrifice of cutting off the tops of the trees and scraping them down to the roots, placing bands about the trunk with some greasy material, so as to prevent them from ascending the tree again, it has been proved that it can be exterminated altogether. I have seen several instances of that kind; that of course amounts to the loss of two years' crop, but I have seen trees where it has been done, and where after two years the tree was as good as it was before any scale had been there.

Mr. A. Block, of Santa Clara: Mr. President, it is well to get information. It is stated here that this insect does not thrive on acacia trees; now I know that they thrive on locust, and I would suggest that a watch be kept on the locust, for I have seen them on the tree thickly. I know in our neighborhood the first we discovered were on the acacia tree; they covered the ground literally, and while the tree has been cut down, and washes used, and everything almost, they have not been exterminated. There were some indications on some locust on my place. I hauled a load of straw and covered the ground with it, and cut down the tops of the trees and set it on fire, and I have seen no signs on the place since, and I believe that is the very best way to exterminate them; it is the cheapest and best way. Fighting them afterwards, it is almost impossible to extirpate them. I believe that coal oil used in different ways may be a good remedy; I know people that have killed them with it, but there were so many on the ground that they have not succeeded, and I believe the most effective way if you find one or two on the tree, is to cut down the tree and destroy it effectually by fire, for it will be the cheapest way in the long run.

Mr. Klee: I want to say that there is rarely a tree or a plant that it will not harbor on, but like other insects it has its preference, and that preference seems to be on citrus fruit, and the whole family to which the locust, the *Leguminosæ*, the acacia, and a great many other trees belong—to that large family of trees—but it seems to be able to harbor and exist on almost everything; in fact, I have had some in a paper box which hatched out and increased inside the cover of this box, where there was nothing that could be seen that they could make a living on; how they did it I do not understand, without they lived on particles of dust.

Mr. Lelong: I have found this insect, the *Icerya purchasi*, on every kind of trees and every kind of plant; I have found it to affect every kind of deciduous trees, with one exception—that is the olive. I have found them on the olive, and they do not seem to prosper at all, do not seem to live there. For instance, at San Gabriel, where the orange and other trees have been infested for five or six years, not one can be found on the olive; and at Santa Barbara I found three or four olive trees among a lot of nursery stock that were infested with this scale, and then dead; those olive trees remained there without a single insect being found on them. At Los Angeles, five or six years ago, Mr. Coronel planted an orange orchard. A tree was planted up to an old olive tree, with the intention of taking up the olive tree; time passed, the olive was not taken up, and to-day the orange tree is badly infected by the scale and not one to be found upon the olive. In regard to the discovery of that name, I forgot to say that I differ from Mr. More in regard to the party who described it. Mr. Maskell, the New Zealand entomologist, described it. I have had letters from all over the country, from foreign countries, from England, and a good many letters from Cape Town, South Africa; they tell me that it has covered all trees there, and there are orchards there two hundred years old that are very badly infected by the insect.

Mr. Cooke, having returned to the hall, was requested to address the convention on the subject of injurious insects.

Matthew Cooke: I think the day is past when we need be afraid of the codlin moth. I am satisfied now that we can say that we can cure them, if we go about it in the right way; the last two years experiments have satisfied me to that extent. Two or three weeks ago I was down to Santa Clara County, and traveling around with Mr. Arden, of Saratoga, we came to a place where about seventy trees had been cut out. I wondered what was the matter. He said he did not know; but when we found out there were seven hundred cut down which, on account of the codlin moth, he could not get any pears off. That whole country down there are cutting out their apple and pear trees on account of the codlin moth. I am perfectly satisfied the codlin moth can be got away with, and very profitably, too. The San José scale can be got away with without much trouble; of that I am perfectly satisfied, and if every fruit grower would only go to work, and do his work thoroughly, he would have success; but the great trouble we have had is, that we can't get them to follow instructions; the whole cry is, "Get the cheap wash." It costs as much to spray mere water on the trees as with material that is worth something. There is one instance that has come under my observation this summer. I was traveling along a road in a buggy, and I went in to see a man that got off a new project for spraying trees for the San José scale. I told him I did not like to interfere, but if he would take my advice he would stop using that wash and use something else that would be strong enough. He had sixty-six trees washed when I went there, that cost him about $7; to wash the other trees, washed on my recommendation, cost him over $11; the result was that he had eighty-one boxes of fruit off of the first washed trees, the other sixty-eight he had two hundred and eighty-one. The farmer must learn the chemical structure and growth of the plant before he can fight the scale intelligently; he then must learn the natural history of the insect itself, and when he has got that there is no insect that we know of to-day but what he can get the best of; but if he don't understand the insect, and don't understand the chemical growth and structure of the tree, he is working blind. Mr. Dye, down the river, came to me and wanted to know what to do with his trees. I told him. Says he: "Is there anybody here that has tried it?" I said: "Mr. Stevens." I had been to Mr. Stevens' place and saw what he had done; he said he had spent $900 that year. Mr. Dye tried his experiment; it was a failure, for neither of his men looked at the tree and the condition it was in when the application was made. You take a tree with the branches very thick, all covered with scale; you put on coal oil, one of the very best insecticides we have, and the next year the branch will die; but you apply lye, it will protect the tree and give it a new growth. I have tried it on four or five hundred trees in this neighborhood. Mr. Klee was with me this summer, and he searched the trees and did not find a scale on them. There is no trouble; it can be done if a man goes around while the men are at work to see that every branch is washed; the same way with the cottony cushion scale. One time last year there were certain exposed places here where any evil disposed person could go and take a handful of them and scatter them broadcast. I went to the Board of Trustees, who gave $200 to get rid of them; and there were a half dozen places in town from which it was spreading over the country. It is the want of care that is the cause of these disastrous results. I feel better on the insect question now than I have done in a great many years. It would seem strange for a man to tell you that he paid a man this year $49 to save his own crop, but it is nevertheless a fact. I wanted the work done, and furnished him with the material, and when he came to get the money he says: "I should have a few more dollars against you, but as saved the crop I do not think it would be right;" but he made me this proposition: He would give me fifty boxes of apples this year and seventy-five the next if I would give him control of it—yet I had to pay him $49 to do the work and save his own crop. Gentlemen, you may think it strange, but we have hundreds of people in this country just like that; many in this vicinity, whom if you go to and say: "Here, your orchard has got the San José scale; I will wash your tree and guarantee to clear it for you; all I ask is your permission." The first question he would ask is: "How much is that worth to you?" It is a fact, gentlemen; there is no use of talking, I am telling you my experience. I believe that to use that wash, half potash and half caustic soda, and the benefit the tree would receive, the improvement to the tree would fully pay the expense, without charging anything to the bug at all. It is only a question of time when we will have to use fertilizers, and there is no fertilizer that is better than potash, and I am satisfied that there is no difficulty about it if you go about it intelligently; but the trouble is there are too many advisers. Now, there was a case here two years ago of a gentleman in financial difficulties who had a very fine orchard; he came to me to talk about it; there was a mortgage of $15,000 on it, and he could not get anybody to advance as much on it as what he had. I told him for about $1,000 he could save his pear crop and save three or four thousand dollars worth of pears. He said he had a brother-in-law from whom he could get the money. I told him any time he wanted my assistance I would come. Two or three weeks passed and no word came and I saw him shortly, and he said: "You must think we are made of money; I have got a cure that didn't cost me $10." "I am glad you have got it; I wish you would tell it to me." Somebody told him to go and get a load of eucalyptus branches and put them in the pear trees and he would have no codlin moth. What is the result? Neither pears, nor trees, nor orchard; it is all gone. That is the trouble.

You tell a man a remedy; the man would say that stuff is too strong. The result is he washes the trees with something else, and it is no good.

For two years I have been making experiments with Paris green and London purple, and I believe we have found the secret of saving the late crop with London purple and Paris green—that was used in the case where I paid a man $49 for saving his own crop. I was making experiments with that, and I was satisfied with it. I believe, with the sulphur, we can save the early crop, but the late crop we can't save with that; we can save it with the London purple and Paris green, and only one application. There are crops with only one application this year, and you can find whole boxes without a worm in them. The codlin moth seems to be the thing they are all dreading, and, I think, we have got the best of it; and, I believe, the San José scale is to be feared no longer, and what will take the San José scale will take any other. If farmers will go to experiments on their own hook, I would not advise them to go beyond five or ten trees at first; let them try it on a few trees, and they will get the results just as well as if they try by the acre. There is no doubt in the world but what the amount of money that is lost to-day in California from insect pests, is equal in amount to what pays the State and county government; and, I believe, that if men will go to work at it intelligently, that just that much money can be saved at the end of the year. The vineyards are not so bad, but some places there has been a great deal of trouble with them, too. The fruit growers can see that I have the greatest hope in the world that we have got the best of the bugs, for if the fruit grower goes to work, there will be no trouble; it will cost money, but, as I say, it will take three times the amount, if the work is not done intelligently. If you can't make up your mind to work intelligently, better not work at all.

Mr. Hatch: I would like Mr. Cooke to explain the purposes of the Information Bureau he has started in Sacramento.

Mr. Cooke: Some time last winter, at a meeting of the fruit growers at the State Convention in San Francisco, there was a proposition made, as I understood, of making up a subscription to hire me by the month by the fruit growers. I never got any idea of what it was, only what was explained to me about it, but when the proposition was made to me, I told them I did not think it would do, because I had come to the conclusion that if a man had to pay for knowledge, no matter how little it was, he wanted it, and anything he got for nothing, he treated it in the same manner, as worth nothing. According to the advice of Mr. Hatch, Mr. De Long, and some others, we opened a subscription to open a Bureau of Information, in the month of June; there were about a hundred signers to that, and the subscription is about $700; there was no hurry in starting, for it would be November or December before anything could be done. One of the ideas was to publish a bulletin every month of what was to be done the following month; the one for June came out, the one for July, September, and October came out to-day—it is a double number—and the first of the month, the fifth number will be out; it is working very well, and if funds enough can be got, I believe it is the best thing that could be started for the fruit growers. The idea was that the subscription should not be less than a dollar. You can give five, or you can give a hundred, but not less than a dollar; yet, within the last four weeks we had five of a half, and four of a quarter of a dollar. Some men were so liberal that they wanted to get twelve twelve-page pamphlets, postage and all, for 25 cents a year. But the way it is looking, the way the information is received, seems to me to indicate a success. There is a twelve-page pamphlet out every month, and as the experiments with the codlin moth, in the apple and pear business, go on, they will be explained. Another idea was, to get a museum of the fruits of California, and get a new nomenclature of fruits, for to-day things are mixed up terribly. You may find a half a dozen men each give a certain apricot a different name; the same way with apples; the same with peaches; but, of course, $700 will not do all this. I think we have enough subscribed to publish this pamphlet for twelve months, and we want all fruit growers to take hold of it—to take an interest in it. There are men taking hold of it that have done nothing before. I can give you an instance of it: One gentleman came in to my house about a month ago—he had subscribed $20; his neighbor, of equally as large an orchard, subscribed $1; the man that paid the $20 came in, and says: "Did I give you enough—I can give $20 more?" "Well," I says, "you have got flush; where did you get the money?" "Well," he says, "that neighbor got a ton of whale-oil soap, and never did anything before; I can afford to give $20 for that." There is one instance where we have got a benefit from it, and there are others in the same way.

Mr. Block: Mr. Cooke recommends potash to use as a wash; I would like to ask him to give us the name and the brand of the particular potash that he would recommend. He will understand the importance when I point out the fact that you cannot buy any two different varieties which are alike in strength; in fact, the same variety differs. Now, I have recommended "Commercial" potash, which Mr. Cook did recommend a friend of mine to use, last year; he bought it and put a certain quantity into water to dissolve and the water got to boiling heat; potash does not do that. My opinion was that whatever potash he got was adulterated with unslacked lime.

Mr. Cooke: No, the potash would make it hot.

Mr. Block: I would like to have a definite name, definite variety, by which we all will know what to get. I know we can buy potash or concentrated lye of 20 per cent strength, and others would be 80.

Mr. Cooke: I will say to Mr. Block that this friend from San José wrote up to me for that, and I replied to him that the name as known to the market was "Commercial" potash, but that the next number of the "Golden Notes" would have a fuller description of it; it is commercial potash, 65 per cent potash, but the next number of the "Golden Notes" will have a full description of it and of all the potash in use. I would use 65 per cent potash; it is the best for the trees that I have found; the concentrated lye is only a little over 8 per cent of potash, it has 92 and a fraction per cent of caustic soda; now in this, this over 50 per cent makes the greatest difference in the tree imaginable. It gives a smooth, bright bark; the trees will not be bark bound in any way by it. It costs 8 cents a pound. The difference between caustic soda and potash is this: You take a pound of caustic soda and dissolve it and wash it on a tree, and as soon as the water evaporates you can see with the naked eye the caustic soda, which forms in globules on the bark; the potash penetrates the bark, and whenever it comes damp weather it will wash the soda off, but you will find the potash on the surface again; it is there all the time; it impregnates the bark so that the insect cannot live in it, and it makes a fine growth of the tree. In Weinstock & Lubin's orchard were three or four trees I wanted to cut out altogether; they did not cut them out, but washed them, and they made the finest growth imaginable. It is there where I took Mr. Klee where there were three or four hundred trees badly infected, but now you cannot find a scale on them. It can be done if it is done right. There is no use in burning the bugs; my idea is not only to kill the bugs but to fertilize the tree. In talking to Mr. Block when I was down there, he gave me some information and I have been trying his suggestion, that in making soap, to use four pounds of rosin in forty pounds. I think it is going to make one of the best washes we have for the woolly aphis; I have been trying that, and will further when I get home.

Mr. Klee: I fully corroborate Mr. Cooke's statement as regards the potash as to make a wash. In my travels I have noticed this, that in many orchards, and wherever there has been good, thorough work, it has accomplished its result. This wash has done what I have never seen any other do before—kill the apple louse, or oyster-shell scale, as it is sometimes called, that I have tried for years to exterminate, but never accomplished anything before. We use the solution of half a pound of potash, half a pound of lye, to five quarts of water, for the San José or red scale—the *Aspidiosus perniciosus.* I have watched the effects in many cases, and some of the very worst cases have been a great success. There are men in this room who have tried it in badly infected places, and I think they will stand by me in this assertion. The orchard Mr. Cooke refers to, of Weinstock & Lubin, was visited this summer, and the work being done well, and the result was good. I think in that solution we have about as perfect a remedy for a winter wash as we can get for the San José scale. I believe that washing for that insect is better done in the winter, because although we know that the insect hatches out by crops, and that most of them will appear in the summer, it is an invariable fact that some of them will also remain between these crops, and enough to keep the stock up. When we get a remedy that we can use in the winter time strong enough to kill the matured and perfected scales, we can do away with them all at once; and if the tree has not a cracked bark, and is not very large and hard to get at, it can be done by spraying with that compound. If the tree is very large, and the branches interlocked so that you cannot get to it, I think it is necessary to make a sacrifice by cutting off the tops of the trees quite considerably, merely to enable you to reach every point in the tree; that is the main point, to get at every part of it, then we can do the work. It has been accomplished, and if it is done well and followed out, and everybody coöperates, that scale insect will never be thought of a great deal any more; that is, it will not be regarded as anything very formidable.

Mr. Sol. Runyon, of Courtland: Mr. Chairman, I have tried during my experience in fruit culture, almost everything that I or anybody else could think of, and with some success only; with washes, so far as I know now, I had the best success, as Mr. Klee states, with caustic soda and potash; I used it last winter. I do not know what strength it was I used. I think a pound of each to five gallons of water, but the strength of the potash and the caustic soda I do not know. I think it was about 80 per cent of the caustic soda; it was not marked. In my opinion, people who use the alkali washes, caustic soda, and potash, have been working considerably in the dark. What first called my attention to it was I went to San Francisco to make some purchases and went to different importers to inquire the price of caustic soda and potash; I went to eight or ten, I guess, and they all had about the same price, very little difference, and finally came to one gentleman named Bateman, and asked him the same question. "Well," he says, "that depends upon what article you want." "Well," says I, "isn't it all alike; I supposed caustic soda was caustic soda?" "Oh no, my dear sir," he says, "there is a great deal of difference—I have it all the way from 60 per cent up to 98 per cent." That staggered me; I stopped and says: "I guess I do not know what I want." All the receipts and bulletins I have seen say so much caustic soda, so much potash, and I did not know whether I wanted 60 per cent or 98, but at any rate I sent afterwards and got the caustic soda—I do not know what strength—and used it half a pound of each to five gallons of water, and with very good success; it seemed to kill all the scale at that time, and I thought I had pretty much exterminated it, until this fall, when I found there is a good deal of scale on the trees again.

Mr. Block: What effect did it have on the trees?

Mr. Runyon: It killed a good many fruit buds—that is, I think it did—but before I washed it with caustic soda and potash I had just as good and as much fruit as anywhere; I thought it injured the fruit, but by seeing the trees that were not washed shedding the leaves in the same way, I made up my mind that though I did not have a good crop on any of the trees, I had just as good a crop on those trees—in fact, better—that I had washed with caustic soda and potash than those I did not wash at all; but in using the lye at different times—there were a couple of days when there was quite a strong north wind, but it was getting late and I was in a hurry and used it on some Seckel pear trees, and it seemed to hurt the tree very much; hurt the young, tender twigs and cut them back considerable; I laid it to using it in that strong north wind. When I used it in the wind it looked as if there was a white frost all over it; it seemed to crystallize on the trees. Afterwards there came some damp, foggy weather, and I went back again and those trees that I sprayed in the north wind it seemed to injure them very much. I do not think I kept it thoroughly agitated. I mixed my caustic soda; the tank that I had it in fed from the bottom, and it seems that some trees were injured worse than others. I made up my mind that it was because of the caustic soda and potash not being thoroughly mixed. The trees that I washed from the bottom would be of double strength; there the trees were injured and also nearly all the fruit was killed. That was my experience with the pear trees. I used it on peach trees and with a very wholesome effect on the tree, but it killed the fruit, but that I laid to being too late; it was in February, and the buds were considerably swelled, and I used it very strong and the fruit fell off of the trees. I laid it to that because the trees that I did not wash had a good crop of peaches on; but the peach trees that I did wash made a decidedly better growth in every respect than those that I did not wash. They have a blight, as it is called; I do not know what it is—it may be a peach mold or something—and all the leaves fell off of all the trees I had there, especially the young trees. The trees that I washed with lye were not affected in that way at all, while right beside of them they were. The great difficulty with that wash is that the expense is too great, unless I could practically exterminate them, because I have got to go over the trees again. I endeavored to do as good a job as I knew how—did not spare any expense at all. I have also got some trees that I washed with other washes that is cleaner than potash, but the wash is some more expensive, though very little; I have used almost everything. I have used another wash, that I am not at liberty to speak of, this fall; I have only used a small quantity of it; at the present prospect, if I am rightly informed, it takes the lead of any wash I have seen yet; it has only been on the trees a couple of weeks and I can't find anything on them yet; whether it will hurt the tree or not I do not know. It is a new thing; I do not know what it is myself as yet.

Mr. Hatch: A few words as to my efforts to dispose of the San José scale: Winter before last I dug up and burned all the trees that I could find that had it on. The next fall I found I had a great many more trees infected than I had at that time. I cut them off about four feet high; large trees, probably six or seven inches in diameter at the butt. I washed them with a swab, going over all, then returning and returning, in all three times, using a half pound of caustic soda, a half pound of potash to a gallon of water, and cleaned them of the scale; and in that manner we cut off every one where we could find a scale, and I think we found every tree that was affected in the least. Well, this summer we found plenty of scale. We killed all we found, there is no doubt about that, but yet there were many that we did not find; and this fall, in other parts, half a mile from where there were any trees known to have scale, sometimes one tree badly infected, and then you may say, hundreds of others that have some scale. These were not trees that were planted there with the scale, but half a mile from any that had been introduced there by that means; and, by the by, all through the summer, we had from two to four men looking for scale, and destroying them on every tree on which they could find them. But it seems that as late as along towards last fall they seemed to develop more rapidly than any other time—at least apparently so with me—and we had hundreds of trees where we had no idea that there were any, although those trees had been looked over during the summer. The way that I look at this San José scale, it is the worst thing that I have got on a fruit ranch. The codlin moth, I think there is no trouble about that, but this scale seems even to be carried by small bugs. I think the way it was spread so last year we had so many of these striped diabrotica that eat the peaches and apricots. They were very numerous, and where they were most numerous there we found the most scale. They fly from one tree to another, and these scale bugs, when they are in a certain condition, they seem to catch hold of anything that flies, or that does not fly, and go wherever it may be carried, and there take hold again. It seems to me, from my experience, that it is necessary, if I have any scale, to go over every tree, for fear there may be one scale on one tree. They may so develop in such trees during the season as will require great and extensive work.

Mr. Buck, of Vacaville: I will give a little of my experience. Two years ago this fall I found, on a lot of young trees, some scale, and after going through a lot of two thousand seven hundred trees with a very strong wash, we thought we had them all. The next season we found that we still had plenty of scale. We then used a summer wash, as soon as the fruit was off. This was on peach trees, and killed a very large percentage of those that were on. Now, this season we find, not only that we did not get them all the first season, nor did we get them all the second year, but hundreds and thousands of trees around them have got plenty of them this year. Judging from the fruit that I have seen this year, and the trees that I have seen in different localities of the State, I do not think that there is any question but what there is plenty of scale in almost every section of the State. I do not believe that the scale will go onto the fruit until there is plenty of them on the tree, and I have seen in San Francisco and Sacramento, both, fruit from almost every section of the State, that had scale on. And I think that it is one of the things that is going to solve the fruit question more than anything else, because it is something that attacks almost everything, unless we except, perhaps, the Black Tartarian cherry, and, to a certain extent, the apricot. The peach, the pear, the apple, the plum, almost all the fruits that we have, are attacked and seriously injured by the scale, and by this one scale. I would be only too happy to be one that would give employment to Mr. Cooke or any other man that could furnish anything that would be a sure cure for the scale. We have just finished washing a large number of trees, and to all appearances the scale is virtually dead on those trees, and I believe you have not only to wash summers; you have got to wash winters, too; you have got to continually wash to keep the scale down, because it has got to fit itself to those places that any wash will not reach, and there may be enough left to scatter and spread it the coming year, even with a very thorough and very strong wash.

Mr. Block: I am satisfied that the San José scale can be kept in check and very probably exterminated; I have had a great deal of experience with it and done a great deal of work. It has been not only a labor of love with me, but unless a person loves labor, he had better not start in to that business at all, and besides that it has been a considerable expense, but I am satisfied that I have nearly conquered it. I am satisfied you cannot extirpate the scale by summer washes; you can keep it in check, and hold it in check from spreading, but on account of the foliage it is impossible to reach every part of the tree in summer, yet I have in some places entirely destroyed it, but I have destroyed all the foliage and everything on the tree. My friend Mr. Cooke has pointed out a proposition; I am very glad that he says there is some prospect of success with it. I directed his attention to an experiment that I had made that I struck by accident, and I will state it here for the information of others, with the hope that they will experiment with it; I think by so doing a wash may be produced that will cost instead of 6 and 7 cents a gallon, which is very expensive, and a wash very hard to handle—that I can give them one that will be easy to handle and will not injure them, that will not burn their eyes or anything of that kind, and that will be very cheap and can be produced for a cent or a cent and a half, or possibly a cent and three quarters a gallon; it is one of the soap washes, by melting with it some rosin, say four pounds to the hundred gallons; it is by melting it in to make a soap of it—I do not know but pitch tar will do; I have tried it myself and am very much pleased with it; I have used it this summer and know I have checked the scale to a very large extent. I do not consider it perfection, but if you experiment with it I think you will find it is worth experimenting with; it is cheap and your help will not complain that it burns the eyes and their fingers and their clothes; but for your guidance I will say you have got to melt the rosin, boil it in potash a very little, put it in the soap, put in some grease, not too much. It does not cost much, you can try it, and I do not know but what pitch tar will have the same effect; I am experimenting with it, but am not prepared to say yet how complete a remedy it is. I directed Mr. Cooke's attention to it; I told him I had a way of sticking the insect; I do not claim that you can destroy the insect in summer when the foliage is thick, but it is something that is worth trying. In connection with winter washes I can give you a few others—*sal-soda, one pound and a half to a gallon*—I think you can buy that this year at about 85 or 90 cents a hundred; this will make a very cheap wash with whale-oil soap and sulphate of potash, or in any other way. You should take your sulphate and let it stand a few days until it smells very strong; now mix that in and wash with it. I have found that a very good wash, applying it hot, and it is very cheap. Some have used saltpeter in that same wash; if you make it very hot it will have some effect on the foliage of young trees; I should recommend it, but on pear trees you cannot use it so strong. I forgot to mention with it you have got to use about six gallons, 6 per cent of whale oil—make soap of it with the sal-soda dissolved in the boiling to make a soap of it as it is; I should recommend a gallon and a half of whale oil to about twenty-five gallons; I have applied it boiling hot and probably it was the heat that has affected my fruit buds, but that it is an insecticide you can virtually destroy the scale with it; you have got to be very careful in washing. My friends here complain that they have not destroyed the scale; it is very difficult; you have got to watch your employés in using these spring washes and see that you wash every part of the tree; there is the secret of it; if you wash nine-tenths of the tree that will not do, and if you do not watch thoroughly your help will shirk. Now with sal-soda they will not shirk, it is not strong and don't hurt them; I have used also in connection with that some caustic soda, that holds it, but of course the more caustic soda you use the stronger it is, but the strongest I have used is twenty-five pounds to the hundred gallons of 60 per cent caustic soda—that is the strongest, and I would not recommend to use it quite so strong. I make these suggestions for your consideration, hoping that you may get cheaper washes from them, and that better work can be accomplished.

Mr. Hatch: There are no doubt many washes that will destroy the scale. So far as my experience goes we have killed all the scale that we could find, and more too, but after all that they appear again without any apparent cause, and half a mile from those places where they did exist before, with intermediate spaces of considerable distance between the places infested before where they are chemically clean of scale. In the trees we treated we kill them winter and summer; we do not stop with washing it once, we do it again, and if there is any scale we go after it; we do not care if it takes the leaves, we do not care if it takes the buds, the trees, the branches, and the roots, we will kill them, but then they appear in some places which were not infested before; that is the trouble. Then as careful as we may be ourselves, others may not be so careful. Others who have infested orchards may be a half a mile away, and we are liable to be infested from them; that is where the trouble is that makes it an interminable job. The trees may be entirely clean this year, and next year affected again. Until there are some effective and efficient measures by which those who will and those who will not may be made to do for the public weal that which we should, we will have these troubles, and our efforts will be very expensive luxuries, and the question of overproduction will be very easily solved.

Mr. Block: There is one question I desire to call attention to. There is question in varieties. Now, for instance, I have had a patch of Easter Beurre pear trees; now the same wash that has destroyed the insect on the Bartlett pear trees has not destroyed it on these. Although they belong to the same family of fruit, they have been more tenacious of life. I do not know whether the insect has penetrated deeper into the bark, or whether they went deeper down into the roots. I am speaking of young trees. I should recommend in all cases to work pretty well down into the ground, scrape away the dirt and wash them down. My inference is that those that have been infested went down into the roots, and in washing the tree there have been sufficient insects left at the bottom, near the ground, or even below the ground, to restock the trees again. Those trees I had to wash several times before I succeeded, although I washed them as carefully as the others.

Mr. Hatch: I would like to ask if any one present has any knowledge that the scale does work upon the apricot tree. We have apricot trees adjoining peach trees that were at one time very badly infected, and after repeated searches we have never found any except on the peach root upon which it was budded or grafted above.

Mr. Shinn: You will remember that eternal vigilance is said to be the price of liberty, and eternal vigilance will be the price of liberty or freedom from these scale pests. So far as the scale is concerned, however, I must agree with my friend Cooke, whose experience and observation on the subject is equal to that of the best of us, that the scale insects may, with proper vigilance and attention every year, if not entirely destroyed, be kept within reasonable bounds, so that our crops of fruit may not be destroyed by that means; but the codlin moth, the apple worm which will certainly destroy our apple and pear fruits on this coast totally, unless something can be done with them, is a totally different matter, because their ravages are upon the fruit. What is the remedy for that? I think the suggestion of Mr. Klee is taken from the best authorities that are within reach, and is very valuable indeed; but there is a vast difference between our circumstances and those of our eastern people, mainly because the winters are so severe that unless the moth is able to find a particularly warm place to make his cocoon and hibernate, they freeze to death; the result is that the first brood is very small.

MR. HATCH: I would like to say that I am satisfied that the codlin moth can be disposed of much more readily than the scale. One reason is, the codlin moth, while it is true has wings of its own, still its life is very short, whereas the scale is carried by birds that fly for miles. Another reason, that the codlin moth does not kill a tree, and the scale does. It seems to me that the remedies for the codlin moth are much more effective and efficient. One that has been given here, of Paris green and London purple, was described in a fruit paper published in the fruit regions of the State of New York some five or more years ago, and was said then to have been successful and very satisfactory, and that was talked over at the State Horticultural Society in San Francisco, yet it had not been used in this State for fear of the poison. I know I did not use it, on that account; but it seems, from the information we have now, that it is perfectly harmless, to be used at the strength designated by Mr. Klee here to-day in his reports. Now, the codlin moth can be got away with in one season, by picking the fruit or cutting the flowers; there is no doubt about that. If the fruit were destroyed for one year off of every fruit tree in the State of California in which the codlin moth lays its egg, there would be no further trouble about it.

MR. GRAY, of Chico: I have heard it said that the San José scale would not live in the hotter valleys; I would like to know if that is not so. One gentleman from Santa Rosa told me that they had no San José scale up there; that he did not think it would live there, that it required an atmosphere more moist. If that is the fact, I say blest be the heat of Chico. We have been exempt so far from this scale, perhaps with one exception.

MR. HATCH: They have planted themselves in the Vaca Valley, and Chico is very little hotter than that.

MR. KLEE: In answer to Mr. Shinn, I will say that I understood Mr. Cooke to say that an early wash of sulphur and soap, and a second wash later, of London purple and Paris green, are the remedies that he found successful; in other words, the remedies that I think we can rely upon. There still remains a point to be settled in that connection which I tried to bring up in my report, and that is, that in this country the fruit has not been analyzed—the fruit that has been sprayed with London purple and Paris green—and until we have that analyzed, and a great many samples, we cannot be perfectly sure as to its non-poisoning character. You remember those instances I referred to were from the East, and although I think it is the remedy, I think it takes another season to determine definitely; and I know that Professor Hilgard the coming season will be glad to analyze such fruit again, and when that is done I think we may be perfectly certain that we have the cure.

MR. BUCK: I would like to ask Mr. Klee if he has ever seen the San José scale on the apricot or on the Tartarian cherry, and if not, whether he can give a reasonable explanation of that fact?

MR. KLEE: I have stated that I have not seen the San José scale on any fruit of the apricot—I think a few on the apricot fruit but not on the tree. As regards the Tartarian cherry, I think I have seen a very few, but it is a matter of fact that where you find the Black Tartarian cherry mixed in with all other kinds of cherries it stands almost untouched; and the same way with the apricot, it is not affected.

MR. BUCK: It seems strange that it does not affect the Black Tartarian and will affect the Royal Anne.

MR. KLEE: Yes, it will kill it almost; it is a very serious question, and I have thought a great deal over it, and talked of it with Professor Hilgard, and he seems to be very willing to make some analyses of the bark of the different trees, and I think, as he does, that it is probably due to some structural difference—probably the thickness of the surface bark—all these insects, you know, have to suck through the bark, and it may be the same reason why the red spider does not work on certain almond trees, and on others will.

MR. F. W. BUCK: I would like to ask Mr. Klee if he has seen any of the work of this inoculation which has been done by this man up in Ione City?

MR. KLEE: Yes, sir, I have seen his work, and I have not seen any good effects from it; I have seen bad effects from it. I have seen a similar experiment tried in a large orange orchard in Los Angeles County; a man paid a thousand dollars to have his trees inoculated to free them from the black scale, and there was plenty of black scale, as much as ever, and a gum-like substance oozing out of the wounds. So I have seen peach trees killed by inoculation; I have no faith in it, and I can't see how it will work; it is inconsistent with all the laws of vegetable physiology that I know of.

MR. F. W. BUCK: There has been only one case that has come under my observation, though I have not seen it myself, but I have understood from three or four reliable authorities as to three or four pear trees that were inoculated that the trees were perfectly clean; the scale had been perfectly killed and dried up and fell off, and nothing else had been put on in the shape of a wash. That was three Bartlett pear trees, and I understood that this man had been up and down the Sacramento River and done considerable inoculating on different varieties of trees for this as well as the woolly aphis. If any one here has seen any of those trees I would like very much to know the result. If there is anything in the fact that the scale does not affect the apricot and the Black Tartarian cherry, and if it is due to any quality in the bark of those trees, it seems reasonable that inoculation might counteract that chemical property, and for that reason I would like to know as much about it as possible.

MR. BUTLER: The remedy that seems to meet with the most favor seems to be a half a pound of caustic soda mixed with a half a pound of potash and that mixed with five quarts of water, applied while it is in the dormant bud. My attention was first called to it by an article published by Matthew Cooke something like a year ago; the reason was, if you apply the caustic soda alone it was liable to lose its effect, whereas if you applied potash alone that penetrated the bark of the tree and stayed there, but by mixing the two, the potash would hold the caustic soda in solution to the extent that it penetrated the bark without crystallizing on the outside. Well, it occurred to me that a wash might be made that would be as effective and still the price reduced by introducing another ingredient in place of the potash, for at the same time I noticed in the notes that the caustic soda was the greater insecticide, where it came in contact with the insect, than the potash was, but it lost its effect in the application, from the very fact that it is so soon crystallized. In the way of experiment, I bought a cask of caustic soda, some six hundred pounds, and bought a few barrels of this common soft soap, costing about 2 cents a pound—I will enter into details, because I think the gentlemen will be interested to get the cost of any insecticide, and then they may be able to select the most inexpensive if it is equally efficient. Well, the proportion I used, for sixteen gallons of water, eight pounds of caustic soda, eight pounds of this soft soap, and five pounds of sulphur, the cost of that was about 2 cents per gallon, if I remember rightly; I think I used eighteen gallons of water so as to make it cost 2 cents a gallon; I applied this hot over a good many times, beginning in the month of February. Many of the trees, including the pears and peaches, were badly affected by the scale, some of them I thought to cut down as the only means of exterminating, but by means of experiment, I washed those even that had the most scale, and with this result. After I had gotten entirely through I examined them, some fifty or one hundred trees, and among the whole of those trees I only discovered three scale. Now, as I remember it, that is equally effective as any of the washes spoken of. Mr. Cooke gives as his opinion, that the scale can be exterminated if the people would unite and use the same remedies and continue to use them, but it is almost impossible to get people to unite and do that; that being the case, the only thing to do is to keep it in subjection, and the thing to consider is to get a wash that experience shows to be the cheapest. The wash that I have spoken of that I experimented with, if it proves as efficacious, is the cheapest, so far as I have heard, of any that have been suggested.

Mr. Block: Was that a winter wash?

Mr. Butler: A winter wash; the lye could only be applied in the winter because it would kill the foliage of the trees. I will say in connection with it that I could see visible effects on some of the trees where it evidently was stronger than in others, and while some trees alongside had considerable fruit on, on some of them it seemed to kill the fruit buds, because of its not being thoroughly mixed. When first applied it settled in the bottom and there was a great deal of strength and it killed the fruit buds; it would certainly kill the scale.

Mr. Hatch: Will you repeat your formula?

Mr. Butler: I took eighteen gallons of water, eight pounds of caustic soda, eight pounds of soft soap, costing not to exceed a cent a pound by the cask, and five pounds of sulphur. The idea of mixing it that way was, the sulphur, when it was melted, is somewhat adhesive, and I thought it would hold the caustic soda, and the combination with the soap would keep it from crystallizing, which was the objection which was raised; I applied it hot and cooked them together, first dissolving the sulphur, then applying the caustic soda, and lastly the soap, and then applied it hot.

A Delegate: What do you use to dissolve the sulphur?

Mr. Butler: Heated the water and then put it in until it dissolved. I must confess that it did not dissolve satisfactorily, but I then took gunny sacks, grain bags, and placed them over the cask double, and then strained it through; there was some sulphur that remained but not in very large quantities, and afterwards I found no difficulty in applying it through the nozzle of the hose. I used one of these Cyclone nozzles, and used a double spray; one man pumps, the other applies—one on each side—and found it satisfactory.

Mr. Cooke: In regard to what Mr. Hancock proposed, it is a formula I have experimented with ten years ago; it will not kill the scale insects.

In regard to what has been said about the codlin moth, I have tried in every shape and form to find if it has done any injury. I have found it when I found traces of poison on the apple. I have experimented with it until this fall, and now I am perfectly satisfied that it can be used without any danger—that is Paris green or London purple. Paris green, when it is pure, contains 50 per cent of arsenic; London purple, when it is pure, contains 46 per cent of arsenic, 21 per cent of aniline, and 12 per cent of lime; those are the ingredients of it. Now, by mixing one pound of Paris green in sixty gallons of water, there are tender leaves it will scorch, but very little. I have tried it on the fruit, and now I find that, say on Winter Nelis and Beurre Clairgeau I use sixty gallons of water, a pound of Paris green, and five pounds of soft soap, sprayed on the trees when the buds are just formed—when the fruit is not larger than that—it will effectually destroy the first crop of the worm. There is enough seems to stay in the calyx of the fruit that when the moths fly away there is enough there to destroy it; and the sulphur kept on so that it would smell very strong, as a preventive it will keep it off. The early pears I have saved this year by using the soap and sulphur alone. I kept at it three or four weeks. Putting it on the Bartlett pears, it will save 85 to 90 per cent of them. The question is asked, does the scale affect the apricot? Up to 1882 I thought it was not going on the apricot; but I saw Vestal's orchard, in San José, covered with scale. The only tree I never saw it on is the Black Tartarian cherry, near Mr. Vestal's. I saw the acacia covered with it, and any other tree it came across. It will go on the apricot, although I never saw it on the apricot fruit. As to the use of the arsenic, I referred to Professor Cook, of Michigan. He says he used apples sprayed with it in his own family. We have three or four broods of the moth here. We have three, certainly. There in the East, in a great many places, they have only one brood.

Mr. Shinn: You do not imagine, Mr. Cooke, that the second brood of the moth will deposit their eggs in the calyx?

Mr. Cooke: No, sir; they go any other place. There is one thing certain, the soap holds the Paris green or the arsenic, and as the fruit grows the soap will scatter so that it will not have any bad effect. There is no danger of it; I have tried for two years and been very particular. As to the expense, in Weinstock & Lubin's orchard there were washed one hundred and fifty trees in a day, using for them one hundred and forty gallons of the mixture. The trees were nine to ten years old.

Mr. Williams: Did you ever see the scale on the fig?

Mr. Cooke: No, sir; there is a Lecanium scale, I judge the same as on the almond, but not the San José scale. The cottony cushion scale will affect the fig.

Here a recess was taken until two o'clock P. M.

AFTERNOON SESSION.

Mr. I. A. Wilcox, of Santa Clara, read the following paper on the strawberry and other small fruits:

THE STRAWBERRY.

Mr. President and Members of the Convention: The small fruits, so far as the Pacific Coast is concerned, embrace the strawberries, raspberries, blackberries, gooseberries, and currants. These fruits, until within the last few years, have been regarded chiefly as luxuries; but at the present time they rank also as the most wholesome of food, besides containing medicinal properties of great value.

Strawberries.

A minister is said to have remarked that God might have made a better fruit than the strawberry, but that He did not do it. In their wild state, strawberries are found in almost every country and in almost every latitude—in the meadows, on the hillside, and in the mountains. The Alpine Mountains have their own distinct variety. History informs us that about four hundred years ago this fruit was cultivated in the north of Britain, where it assumed a changed appearance, being round in shape and white in color. The white berries were named the Wood strawberries.

The Alpines were introduced into England two hundred years later. The history of this variety shows it to be so persistent in reproducing its original characteristics that but little change is found, after a long and varied experience with it. It finds a natural home in the cold northern regions of our own country. Under cultivation, by means of irrigation, this wild fruit becomes darker in color, has less dryness and solidity, as it contains an increased amount of water in its composition.

Other Varieties.

Two other varieties of this fruit are reported as known at the time above referred to, both having the color of the Wood varieties.

In 1660 a gardener in France is said to have produced the first new and improved variety, the original characteristics of which, we are told, were maintained one hundred years thereafter. A lesson is here taught us, that it is only from the seeds of fruit varying from the original type that we may look for new varieties.

The Virginia strawberry, so called, is the wild strawberry found in our eastern pastures, woods, and meadows. This variety was introduced into England some two hundred years ago, where experienced gardeners found it to produce varied kinds from the seed.

This is the variety from which nearly all of our best kinds originated, and they possess the natural fragrance and beauty which we find among the choicest kinds now cultivated. It is true local conditions and varied systems of cultivation may change the appearance and quality of the fruit. Still, our distinguished botanist, Dr. Gray, classes the varieties found in the Eastern and those in the Western States of our country as belonging to the same species, however much they may vary in color and other characteristics. This fact borne in mind will show the reason why our leading kinds of cultivated berries do not do well in all localities and all kinds of soil, even where suitable ingredients are found in abundance for producing plant and fruit.

It follows, therefore, that we of the Pacific Coast can never foretell the value of new kinds of this fruit brought to this State. It requires actual experiment to determine what will prove good in each locality. While many of our eastern productions will prove passably good in some section or other on the Pacific Coast, I know of only one kind among all the importations that has proved of much value here. I refer to the Triumph de Gand, a Belgian variety.

The old stanch variety, the Longworth Prolific, still maintains its high character in a small portion of Santa Clara County, where the greatest share of this fruit is grown for our markets. But even here it is only in limited sections, even in the strawberry region, where it has maintained its prestige. After twenty-five years of experimenting, it is, everything considered, the best we have, although discarded in the place of its origin, in Ohio.

The strawberry region of Santa Clara is embraced in a section of land about six miles broad, and extending back from Alviso, at the head of the San Francisco Bay. Here the strawberry is the first fruit to bloom and blush in beauty in the early spring. These vast fields, with their white blossoms and ripening fruit, are the admiration of the beholder the most of the year.

Special Conditions for Success.

Among the favorable conditions for success are suitable soil and proper cultivation. Climatic conditions also exercise a controlling influence. While the plants are producing their new foliage, a damp, cool atmosphere is suitable for the purpose; but, as the fruit attains its size, a warmer atmosphere and brighter sunshine are needed to give color and perfection to the fruit.

Some varieties may require light soils, while other kinds will do equally well, under our system of irrigation, in the heaviest land. The Longworth, which sends its root out near the surface, will do better, as a general rule, in the heavy land. But it requires much care, in cultivation, not to injure the roots, and this rule is of prime importance in the cultivation of any variety of strawberry. After the fruiting season, and after the fall or winter frosts, the tops of the plants are to be cut off to the crown with a sickle or other suitable instrument, care being used not to cut off the blossoms that are hidden in the crown of the plant.

Planting and Irrigating.

For the purpose of planting the strawberries the land is ridged up, after repeated plowings to pulverize it, so as to form beds. The plants are put in on the edges of these beds, in rows twenty-four to thirty inches apart, and about eight inches apart in the row. The distance between the rows is the same, whether on the beds or between them. In irrigating, the water is turned on through the ditches between the beds. The sooner it passes through the better, on well graded land.

Irrigation should accompany cultivation, so as to restore, so far as possible, any injured plants. Water should be applied in dry weather as often as needed to prevent the ground drying up about the roots. This is a very important matter, and should not be neglected.

Many plantations are annually ruined by the neglect to irrigate. It is in the dry season that the strawberry borer does its chief work. Too much water in soils not well underdrained is equally as destructive to the plant as the drought.

The intelligent cultivator should always bear in mind that in dealing with the strawberry he is dealing with the most delicately organized fruit plant grown, and treat it accordingly. In early days we planted the beds a quarter of a mile long, and passed the water through the whole length of the row at once. One fourth this distance would be much better.

Well grown plants may be put in during any season of the year in well graded land, properly fitted for the purpose. The usual time for planting is during the rainy season, or in the early spring. For early bearing they should be planted in the fall, the earlier the better, so that they may become well established before the ground freezes. It is much better to put in the plants while there is moisture in the air. Irrigation should be applied during the planting, and should be continued whenever needed, to keep the plants growing. The irrigation is continued during the fruiting season. In warm weather, the water should be applied after each picking say once or twice a week.

Varieties to Plant.

From what has been already said, we will understand that some soils are better adapted to certain varieties of strawberries, and other soils to other varieties.

The Longworth Prolific sends out its roots near the surface when properly planted. The Sharpless, Triumph de Gand, and some other favorite varieties, for the region of Santa Clara, root deeper, and are at home in the looser soils.

At Watsonville, Santa Cruz County, there is a region of country where the sea breeze comes in to temper the air, making this second best place for this fruit, but there, as elsewhere, special varieties must be found adapted to soil and climatic conditions. The Cinderella has proved the best berry here, and is not grown in Santa Clara, the adjoining county.

While eastern writers tell us that we need a "gravelly, loamy soil" for the strawberry, we tell them that we need the soil having the requisite plant food, and many other conditions, such as irrigation, etc.

Sexual Character of Plants.

There are three distinct kinds of plants produced from seed. The male plant is known as having stamens only in place of fruit.

The hermaphrodite berry is called the perfect plant, containing the pistils and stamens. The pistillate berry is known as having the appearance of the undeveloped berry. It has the strawberry shape, with short, hairy-like excrescences.

The hermaphrodite has the rudimental berry surrounded by a tier of stamens, the tips of which contain the pollen, a fine yellow dust, which drops the pistils, thus impregnating it and producing the fruit. Ants and insects of various kinds go from plant to plant in quest of food, and carry the pollen from one plant to the other, so that a purely pistillate variety planted near the perfect berry will be made to fruit.

Producing New Varieties.

We have shown how the unfruitful may be made fruitful by the aid of the pollen, and it will be understood that it is by the blending of qualities in different varieties of strawberries that new kinds are produced. The seed taken from the plants of different kinds growing together, or near together, may produce new kinds inferior or superior to either of the parent varieties.

The usual way to produce new varieties is to select two or more kinds of superior excellence and grow them near together, and plant the seed of the berries produced. The stamens may be clipped from the perfect berry if desirable, and it may then be treated with the pollen of other plants, the dust being taken from one plant to the other by means of a camel hair brush. The fruit taken from the plant so treated may produce other new kinds, but it requires much experimenting to produce a desirable kind, and there is no limit to the experimenting that may be made, while there would appear to be no limit to the improvements in the repeated and continued combinations of good qualities. Of course, favorable conditions for developing good qualities are of prime importance. Suitable soil, suitable climate, and suitable culture all exercise a controlling influence in the propagation of new varieties, as well as perpetuating them in the highest degree of perfection.

I give an analysis of the strawberry plant, made by Mr. Bilius, of Kirtland, Ohio. In 116 grains of the plant of the Garden strawberry he found: Potash, 33.154 grains; lime, 26.519 grains; carbonic acid, 23.008 grains; magnesia, 8.908 grains; phosphoric acid, 6.970 grains; silica, 6.117 grains; charcoal and sand, 3.103 grains; soda, 2.794 grains; phosphate of iron, 1.515 grains; sulphuric acid, 1.469 grains; chlorine, .718 grains; organic matter and loss, 1.739 grains—116 grains.

An analysis of the fruit gave: Potash, 21.07; lime, 14.20; soda, 27.01; silica, 12.05; phosphate of iron, 11.15; phosphoric acid, 8.59; chlorine, 2.78; magnesia, trace; 41 per cent ash.

A later analysis of the fruit is as follows: Water, 87 per cent; sugar, 4; free acid, 1½; nitrogen, ¾; insoluble matter (½ per cent of which is ash), 7.

The chemist adds that the variations in these analyses is probably mainly owing to the greater age of the vines in one case than the other; also, that something may be due to soil and climate.

I am aware that all scientists do not agree in relation to the theory that plants derive food directly through their foliage, but I suggest this for what it is worth.

The constituents of the soil do produce a marked difference in the character of the fruit and the appearance of the plant, as all good gardeners know. Soil strongly impregnated with alkali will impart a light or yellowish color to the plants. The plants will be injured by means of the sun acting on the alkali on the surface of the land, and they are frequently killed outright when the hot weather comes on before the plants have got well up from the ground.

Diseases of the Plant.

The strawberry plants of this coast have only one disease of which I have any knowledge. They are frequently affected by a fungus, or rust. I have sent leaves of the plant to Mr. S. A. Forbes, State Entomologist of Illinois. In his answer, he writes: "The strawberry leaves sent me showed no injury except that due to the common rust." He added: "The entomological fact seems to have escaped us."

I also sent some leaves of this plant to F. S. Earle, Esq., an extensive strawberry grower of Anna, Illinois. Both these gentlemen agree with me, that this rust is caused with us chiefly, if not entirely, by improper irrigation. I may here add, that the constitution of plants is injured by bad irrigation as well as by being grown in impoverished soil. The remedy is to propagate from vigorous and healthy stock, and to use due care in irrigation as well as cultivation.

Strawberry Borers and Other Pests.

While in the East they have a crown borer that works down to the root, we have a borer that works up from the root towards the crown. While ours destroys the plant, theirs destroys the crown, or fruit itself, more directly.

I have been in communication with Professor Forbes in relation to these borers. I sent some directly to him in a vial of alcohol. The vial was put in a wooden case made by boring a hole in a section of broomhandle, and the package went through the mail.

In the report of Mr. Forbes I learn that our root borer is very different from the crown borer. It is a great wonder to me that in all the shipments of plants from the East we have not received the crown borer.

Suggestions.

I will here add that if anything can be done by quarantine regulation or otherwise to prevent the incoming of any new pests, it would be a great blessing to the future fruit industries of the State if such means could be employed.

I have thought that the great future importance of the fruit industry in the United States, and especially in California, would justify the organization of a National Bureau especially devoted to horticulture.

The Agricultural Department, through the new Commissioner of Agriculture, is doing a great and good work. We have a competent United States Pomologist in Washington to name our fruits and do other acts of benefit to the fruit business; but it seems to me we need a special department, to which we cannot only look for information, but from which we could receive aid in everything that concerns the fruit business.

Raspberries.

Raspberries, like strawberries, have a special value as food. Like strawberries, they are a special aid to digestion, besides containing medicinal properties. About fifteen or eighteen years ago I wrote as follows about this fruit for the "Pacific Rural Press:"

> Among raspberries the well tried Falstaff takes the lead. The Philadelphia proves productive, though much inferior in size, and has nothing in quality to recommend it. Knevit's Giant, from large to very large, is of too dark a leaden color to be a favorite and too soft to bear transportation. Its flavor is peculiar, and will suit some palates well—perhaps all who cultivate a taste for it. May do for the amateur, but too imperfect in the impregnation, and consequent productiveness, for market purposes. The Franconia, similar to Falstaff, is a solider berry, but drier and less productive, and consequently less profitable. No other variety worthy of special favor or mention, unless it be the Yellow Antwerp, has made its appearance, and the color of this berry is unfavorable for market purposes, however good it may be for those who like it. Of the black-cap family the Doolittle is the best. The Thornless is too small, dry, and unproductive; the Yosemite too unapproachable on account of its wild nature, armed as it is with thorns. It is a rampant grower, and the berries are large, but of poor color. The Doolittle is the best flavored, most productive, and has the natural bloom and look of the familiar wild varieties that abound in New York and other States. But I find none of the black-caps profitable for the market.

I have now to say that the Black-caps have never become a favorite on this coast.

Further, I may report that we have new varieties of red raspberries which have nearly displaced the kinds favored a few years ago.

Among these the Herstone stands at the head, so far as can be ascertained.

The English Red Antwerp, so called by some, is a berry of superior excellence, outranking the Cuthbert, which has been held in the highest estimation till very lately, among the newer sorts. Hansel is another of the newer kinds well spoken of. It may be here remarked that the raspberries, like the grapes of foreign origin, do well generally in California.

Blackberries.

Until within the last few years blackberries have not been cultivated to any great extent. The Boston High Bush was the first candidate for public favor. This is a sweet berry of medium size. The fruit comes early in the season—at least the bulk of the crop comes on early—the fruit ripening so rapidly that it is all gone in a few weeks.

The Lawton was brought into this State soon after its introduction, about thirty years ago. It was a great acquisition. It originated in New Rochelle, a few miles east of New York City, where it was found wild in a pasture. It is one of the long-cane varieties, but having been browsed by cattle for many years it had become shortened in length and more stocky in body, throwing out side branches instead of long canes. Here it may be said that this pruning has changed the habit of this plant entirely, and it affords a lesson for the fruit grower worthy of being remembered. The isolated plant above referred to, being in an open space, exposed to the warm sunshine when ripening, was made to produce, after many years of radical change in habit, a type of fruit that seems entirely new.

When the Lawton berry was first placed upon the market it surprised our oldest and best pomologists by its superior qualities, and it taught a lesson which has gone into fruit literature, showing how superiority has been produced in the blackberry by pruning alone. But another lesson has been learned since by experience, namely, that this berry would not do for universal propagation. In central New York, where the climatic conditions are unfavorable, the Lawton berry proved a failure, although wild blackberries are common in that section of the country.

A few years after the Lawton had been disseminated, another new kind was brought out, this time from the Kittatinny Mountains of Pennsylvania, and called the Kittatinny. This berry has entirely different characteristics from the Lawton or Boston High Bush. It is the largest decidedly sweet berry we have, and is preferred for canning and other general use to either of the other kinds.

The Lawton is a great favorite when grown to perfection and ripened in the noon-day sun. It will make a palatable wine, fit for medicinal purposes.

Among the new cultivated kinds is the Crandall, or Texas Extra Early, as it is sometimes called. This variety is among the largest, is very fine flavored, comes on two weeks earlier than the Lawton or Kittatinny, and lasts, so it would seem, during the entire summer; at least these remarkable qualities are attributed to it by those who know it best. It should be planted wide apart—say ten or twelve feet apart in the hills—and be allowed a high growth. It is said to ripen up well, and to be less seedy than the Lawton, while containing all the good qualities of this well known variety. The Dewberry, like most wild blackberries, runs too much to be cultivated for market. The blackberry requires moist or irrigated land. If irrigated, it needs good drainage. It will not do where there is stagnant water in the ground, although it will bear a large quantity of water by irrigating in leaching land. The old canes should be cut out at the end of the year, and three or four new canes left in bunches, say three by eight feet apart, as a general rule, for the coming year, and these should be headed down to four or five feet in length, as may prove best. Blackberries are easily propagated from the new canes coming up from the root. But the plants may be grown from fragments of roots planted in beds, to be reset, or put in where they are to grow. It is desirable to propagate choice kinds from the roots alone, as a large quantity of stock can be sooner obtained this way. It is also better for the bearing plants not to dig around them, as by cutting the roots the plant becomes weakened and less productive. The better way is to leave all new shoots needed for the following year, and carefully cut off at the surface of the ground all superfluous shoots, leaving only three or four, or whatever may be needed, of the strongest canes, for the coming year's crop.

Gooseberries.

Gooseberries are the first pie fruit of the season we have in California. They come on in the season when they are especially desirable. When full grown, before they become ripe, the fruit is shipped in bags or boxes to the mines or elsewhere needed, in very large quantities. Much of it is also sold to the canneries, where it is put up chiefly for a distant market.

The gooseberry is propagated from cuttings eight to twelve inches in length. If the soil is compact and heavy, five inches in the ground is quite deep enough. As every bud on the cuttings is likely to put out a top growth, it is well to cut out the buds of the part of the cutting that is to go in the ground, if the plant is to have a body-like shape. The suckering plants are not desirable, as the fruit will be smaller and must be picked with greater difficulty. Those who raise this fruit in large quantities will find it advisable to gather the fruit with buck mittens, by rubbing it off into a pan, and afterwards cleaning up in a fanning mill to take out the leaves.

The chief kind of gooseberry cultivated here is the Houghton's Seedling. Though medium in size, it comes early in the season, is good in quality, and very prolific.

The English gooseberries, though much larger than our seedlings, do not find a natural home on this continent. Though coming from the north slopes of land, in the region of dampness and fogs, these varieties generally mildew in California. But there are exceptions to this rule. There are regions, generally inland or away from the ocean, where some of these foreign kinds are grown successfully. There is a variety sometimes called the

Kelsey Gooseberry,

From the old Kelsey Nursery, of Oakland, that is being disseminated and is meeting with much favor, on account of its large size and comparative freedom from blight.

They may be planted three by six feet apart in favorable soils.

A Delegate: I would like to ask if any one has propagated the Crandall or Texas berry?

Mr. Peck: I think I can tell you pretty near all about the Texas berry. A friend of mine brought a few roots from Texas and proposed to give them to me. Subsequently he took Dr. Crandall's place and planted the roots. From Dr. Crandall I got two roots, and sent to Texas and got a hundred. I have been cultivating them from the first. They yield immensely, and they do yield nearly all the time if they are cared for and watered. Mr. Williams procured the berry from Dr. Crandall, and named it the Crandall Early Texas. I have several thousand growing on my place. It is a good berry every way, and very hearty.

The Chairman announced the next topic for discussion: "Proper Laws to Prevent the Spread of Insect Pests."

Mr. Hatch moved that Matthew Cooke, of Sacramento, S. F. Leib, of Santa Clara, and W. G. Klee, the State Inspector, be appointed a committee to consider this matter.

Mr. Stabler: I have been informed that the present law is very ineffective. In conversing with a number of gentlemen last evening, it was my privilege to consult with them as to the course to take, and the result was a desire to have a good strong committee, well selected—those who would take part in it and do the work. I approve of those gentlemen suggested. It seems to me that it makes a very efficient committee, and they will get together and pass upon the matter. But when that is done only a small portion of what we are trying to do is accomplished. It is a well known fact that when laws of this description are introduced in the Legislature they are amended, substitutes offered, and they are cut to pieces; and when they are prepared with a great deal of care by competent persons, then some person who has little knowledge or experience, and does not devote the necessary time to it, offers some amendment, without thought, and kills the harmony of the whole thing, and renders it inoperative for the whole time. We have such a one, I am told, now on the statute books. Now, I would suggest to each of the members of this convention to ask the members from their respective counties to advocate this bill and allow it to go through as it comes from the hands of the committee.

Mr. L. W. Buck: I agree with the suggestions made by the last speaker, and I believe that this committee should not only do the best that they can for themselves, but then that they should go and secure the best legal advice that there is in the State, with reference to the bill, and the points that they desire to reach, and then when the time comes and the Legislature is in session, and the bill likely to come up, the fruit growers of this State should come here and urge upon the members of the Legislature the necessity of passing the bill.

Mr. Hatch: Mr. President, there is another thing I would suggest, that after we get a bill passed, the members of the fruit growers fraternity do not endeavor to test its constitutionality. We passed a law at one time which would have been efficient, and might have been carried out if it had not been that some gentlemen, in an isolated locality that supposed they would be exempt forever from all insect pests, had not taken the pains to dispute the law, and try its constitutionality, and prove it unconstitutional, which they succeeded in, through the aid of a gentleman in San Francisco. It was a law which, if enforced, would have kept their orchards free from pests. The idea of some of those gentlemen at that time was that they were isolated, and that they would, without any trouble, keep their places free from pests, and all the rest of us not so situated would have their fruit destroyed, and they would get a large price for their fruit. There is one satisfaction for those who did work for the bill, to know that those very ones, who did defeat its operations, are as great sufferers as any to-day in the State of California. Now, it does not matter so much about the bill as it does about the enforcement of it, without question as to whether it is constitutional or not, for there is no reason why any of us should raise such a question. At the time of which I speak, it would have been a small matter to have stamped out and eradicated several of these pests, which now may be considered impossible, but by proper work they can be kept in bounds so that we can have profit for our labors. The community I speak of always received return packages; they had great conveniences, and they used baskets which can be put right on the boat, and the packages returned, and they would last for years. By that convenience they brought home with them the scale, the codlin moth, and everything else that they didn't want, and that is the way we have spread our pests all over, and I think now that if those who have not any of these things will desist from getting the return packages, they will be a pretty good law to themselves.

Mr. Aiken: I agree with those who have spoken on this matter of the importance of the law, but what use can a law be to the fruit growers when, judging from the past, they have neither the ability nor the courage to enforce the law? The law now upon the statute book is not unconstitutional. No law is until it is so declared by the highest Court of the land. It was passed at the demand of the fruit growers, and after it was passed the Fruit Inspector was afraid of it, and no one dared to touch it. Assistant Inspectors were appointed. They didn't dare to do anything; they didn't do anything, or they could, but they wouldn't. There was not money enough in it to pay them for their time, and so it has fallen a dead letter, just as every law that is passed on this subject will fall until the fruit growers of this State wake up, till they begin to feel their strength and exert it to protect themselves from these pests. It is said that the law is unconstitutional; that is a mere opinion that is worth nothing. Now, if we had had courage enough to have tested that question by going and enforcing it, and letting the man who stood in the way test it—unless the fruit growers have the moral courage to stand up and enforce any law that may be passed, it is no use. Let them rise and protect their firesides by enforcing the law to the fullest extent, and allow the Courts to decide upon the constitutionality.

Mr. Blackwood: I have thought somewhat on the subject of a law for the suppression of pests. I would like to know, gentlemen, what pests you propose to suppress and against whom you are going to act, for they are spread all over the country. There is no county that is free from them, so if they are going to enforce a law it must be against themselves, and that is the reason why the law we now have has not been enforced. We do not like to complain of our neighbor, especially when we find that our neighbor is in the same boat as ourselves. We have all got pests in our orchards and all trying to get rid of them, so what is the good of the law? I believe it will be a dead letter on your statute books.

Mr. Hatch: It has been the custom of farmers and neighbors to be as lenient to each other as possible. That is perfectly right; but I think we have carried it to excess in this matter. I think it is proper and right to keep people infected with any disease, which can be communicated as readily as yellow fever or smallpox, apart from others who may be contaminated by it. It is also right when there is what is known to be a glandered horse, where others may be infected, to have it taken away and destroyed; and I do think that it is necessary and right that a law should be made so strong, and that there may be officers with a payment large enough to induce them to enforce it, that if I do not take proper precautionary measures to protect my trees from the pests which are distributed among the fruits of this country, somebody should make me do it, or deprive me of the means to communicate that pest to others. There are scattered all over California, small orchards of a few trees, and those who have them do not care what harm they do to others. There should be a law so strong that those trees can be taken down at the expense of those who owned them, if the pests should not be otherwise eradicated from them.

Mr. Lelong: It seems to me that the committee appointed to frame the bill ought to bring it to us before it is presented to the Legislature; for we may have amendments to it, or suggestions to offer, before the bill is framed. I do not know how we can go home and advocate the passage of the bill to our representatives, unless we know something about it. In Los Angeles County, if we had had this law, it would have saved thousands of dollars worth of property. In the years gone by, when this white scale first came into Los Angeles County, there was no law, and on this account they are to be found in so many orchards there. It will be the same way all over the State; and then they will say we do want a law, but then it will be too late. There are a great many places throughout the State of California where the insect pests have not made their appearance, but it has been through the energy of the Boards of Supervisors. With us we had to elect a new Board; and, at a mass meeting, they were requested to frame an ordinance, and the city also framed one. They have City and County Inspectors, and whenever a nurseryman attempts to sell infected stock he is prosecuted. The Inspector goes into an orchard, and if he finds any pests there he gives a written notice to disinfect, and if he does not do it is prosecuted. Now, the law they are working under, which is the same law you are discussing, is not a dead letter. It is on the statute books. The Supreme Court has not decided it unconstitutional, therefore it stands as a constitutional law, and Los Angeles County is working under it; and I think if this committee would frame their bill, and give it to us about the last day, we would know then, when we go home, what to tell our representatives.

Mr. Hatch: It may be rather premature to do that, to submit it to this meeting, but could it not be so arranged that a copy of the proposed law would be submitted to those who have their names upon the register, and such suggestions as they may deem best, may be submitted by the committee, and it can be amended if necessary. So far as the law is concerned, we have had those, who, from the time the first insect pests were introduced into California, who would say, what is the use of a law, we can't bother our neighbors with that? I know there was one man who stayed in this town all night, until five o'clock in the morning, to get up a law, which was submitted. It might have needed amendment, and all that, but which, if enforced at that time, would have made this pest a mere nothing at this time, and yet it was not done; as one gentleman said, it was too late; it was all over his yard. We can get rid of some of them, let us get rid of what we can.

Mr. Klee: It is true, that throughout the length and breadth of California, there are a great many kinds of injurious insects; in nearly every county you can find them; but, I would not be understood as saying that they are all in one place, or, that there is no use in trying to prevent any one from coming to any one place. There are new sections springing up; there are parts of counties that may be kept free, and while in one county something is very dangerous, another is another, and it is not too late to prevent an interchange of these things; and there I think is where the good work may yet come in.

Mr. Wilcox, of Santa Clara County: Mr. Klee lately suggested that the Board of Supervisors should appoint some one to carry out the law. We had one employed last summer for three months at the expense of the county. When we read that Los Angeles had voted a large sum of money to quell this insect we waked up to the importance of doing something, and by Mr. Klee's directions I called a meeting at our Horticultural Fair two or three months ago and we prepared a petition to the Board of Supervisors, and I expect next week to present this matter before the Board. They have promised to act upon it and give us a local Fruit Inspector and pay him about $100 a month. The Inspector we had during these three months that he was on the ground did an immense amount of good: he had a little notice that he served on every one that did not seem inclined to carry out the spirit of the law, and they generally acquiesced. We must get the public opinion with us, and when we have done this this law will be respected like any other. I remember in Santa Clara County when horses could run at large with the glanders. It was Mr. Frink, a representative from our county, that had a law passed that any horse afflicted with glanders could be shot down by a public officer. That law is respected everywhere. Now, I hope you will do something. I think the committee is a good one and will give us such a law as we need. I myself am on a committee to present such a law, appointed at the fruit union meeting in San Francisco within the last year, and I propose to present such a law if nobody else does, and shall work for it, and though it may take a little time I think the future looks hopeful.

Mr. Buck: My understanding of the present law is that it gives the Supervisors of the respective counties power to act. Now, we have a few of the counties of the State in which the predominant interest is fruit; among them are Los Angeles, Santa Clara, and Alameda, although we have a good many other counties that have large fruit interests—Solano County, for instance. We have two Supervisor districts in our county, a part of whose constituents are fruit men; outside of those we have three Supervisor districts which are little interested in fruit, and Solano County does nothing. The same trouble exists in almost every county of the State. Now, I think we should have a State law which would be not only applicable to every section of the State but to every section of the county. Where the fruit interests are predominant there is no trouble to get the Supervisors to act in accordance with the interests which they represent, but in other counties it is a very hard matter, in fact impossible, to get them to do what they should do, and in many cases a hard matter to get them to do anything.

Mr. Klee: I desire to bring out one or two points to which Mr. Buck just called attention—that there are so many counties where there are other predominant industries, and where no local organization has been found effective for that reason. There, then, we have no way of coöperating. You may appoint any one, you may have the best laws that you may, but how are they to be enforced if there is nobody to see to it? How can one man go all over this great State of California and enforce these laws in all the different counties, or all the different parts of those counties, for some of them are pretty large? One point that must be settled in this law is how to establish the connection of the State Board of Horticulture with the various districts, so that we can be in communication with them, and that there may be some local authority that can enforce the laws. As it stands at present, the law provides that the county may appoint a County Board of Horticulture on the petition of five fruit growers who are freeholders, and they may provide for Inspectors. They may vote some money, and they may not. In some cases they have appointed them, and did not vote any money or did not vote a sufficient amount, and after awhile the thing is dropped. In other counties none was appointed. All we could do was to get so called quarantine guardians. These quarantine guardians could get $2 a day, provided they enforced the law on somebody, and those parties who suffered had to pay these $2. Now, I leave it to all of you, if you think you can find many competent men in California that will take a job, I might say, on those conditions. The last law that was passed contains a great deal of good, but we want the machinery to enforce it. If we do not get that, it will be futile for me to attempt it. I may be in Shasta and may be wanted in Los Angeles or San Diego. There must be some practical coöperation or some way arranged that these men may be in active coöperation with the central organization.

Mr. Hatch: It is the burnt child that fears the fire. I am one of them. I had six hundred and fifty peach trees, and on account of the scale I cut off the tops of six hundred and thirteen, leaving thirty-seven. This year I sold from some of them at an average of $13 apiece; that was six hundred and thirteen I didn't get anything out of, which means about $8,000. Some men who have no insect pests do not want any insect law. Those who have trees and have these pests, and are laboring to remove them from themselves, but are surrounded by neighbors who will do nothing about it, they want these laws; they want to be protected in their labors. They are working for their bread and butter, and do not want to see it taken out of the mouths of their children.

MR. COOKE: There is one law that can be amended in a way that I believe would do a great deal of good. In the past the parties who had charge of the course of study in our public schools, ignored the teaching of entomology, higher botany, and industrial drawing. In Section 1664 of the school law is natural history. Now, the law should be amended to include these. The State Board of Education passed a resolution asking that it be so amended. Now, the ignorance of the pupil was not their fault, but by adding the word entomology to the school law it will bring it into the schools, and bring a little more general knowledge among the people; another law that cannot hurt anybody, but will force the negligent to do their work. We can get up a liberal law that will protect Mr. Hatch in his fruits, and protect his property, by compelling others to protect their own property. I believe we can get up such a law as that.

The place where you want to get the law is before the Committee on Agriculture meets, or whatever it is referred to. You may talk here for six weeks; it won't do one bit of good, so far as that is concerned; I think if the convention see fit to leave it to the committee, a month before the Legislature meets they may report to the Secretary of the Board of Horticulture, who will send copies to members who leave their names with him, and then they can get their opinion in relation to the matter.

MR. WILLIAMS: I think Mr. Cooke has struck the keynote as to the education of the people. The ignorance on this subject of men who pretend to be horticulturists is astonishing. As an illustration, I went over to my neighbor last spring, who had the codlin moth. He was superintendent of a large place of four hundred acres. I said to him: "You have codlins; you must put bands around your pear trees to catch them," and I told him how to operate. I did the same myself, and sent my man round every Saturday to look after his bands—that was his work. In October I asked Mr. Hudson how he was getting along catching the codlin moth. "Oh, I have caught them all," he said. "How many did you kill?" "Oh, I don't know; I have not examined my bands yet." He had furnished as good a nest as is possible to have to propagate them, and nine tenths of the men are propagating these pests through ignorance. Another thing in this law—we must have the oil to run the machinery. Any law in the State of California, or anywhere else, is a dead letter without means to enforce it, and there is where our present law has proved a failure.

MR. R. B. BLOWERS, of Woodland: I have killed bugs until it almost makes me tired to think of it. What I want to get at now, is to have the killing of bugs an exact science, so that anybody can construct a law which will be educative and practical, and give me a knowledge of what to do, for I confess that I am entirely ignorant about it.

MR. WILLIAMS: It is not the old heads we want to get at; it is the little fellows we are bringing up that want to fight bugs after we are gone; we want it in our public schools, where it can be drilled into them, precept upon precept, so that they will know when they come across a bug what it is.

Mr. Wilcox: When we had our fruit meeting, four or five years ago, at San José, this question was discussed thoroughly. Some one made the remark there that this matter ought not to be left when the fruit had disappeared; that it should be kept up; that the bands should not be taken off. I think that was in October or November. I went home the next week and found the moths then alive under my bands. I only make this remark to show that there is no time that you can sit here and tell when the codlin moth commences working and when they get through. In Sacramento, where it is warm, I am told they commence weeks or months before they do with us. That is a very important matter to keep these bands on long enough, and to watch these insects long enough to be sure that we have not left any of them for next year's crop.

The Chairman announced the next topic for discussion: "The Cultivation; the Pruning; the Time to Prune."

Mr. Williamson: Pruning is a matter of vast importance in any country; perhaps nowhere more than in California. I think there is no place where it requires to be studied more thoroughly and more scientifically than here. In any one of the Eastern States almost some one general rule, or general principle, will apply to the whole State, but not so in California. There are no two districts, no two counties, no two localities, sometimes no two orchards that can be trimmed just alike, or that should be trimmed just alike. For instance, in the coast counties the trees want to be trimmed high; want to be left open; not necessarily high, but the people generally do prefer to train them high. They certainly want to leave them open, so that what little sun they do have and the air can get to the fruit. I mean in those foggy districts, while up here in this part of the country and up in the foothills we want, in many instances commonly, to protect our fruit from the sun. So you can readily see the great diversity of climates require a great diversity of methods of pruning; in fact, a general rule for pruning all trees is impracticable anywhere. The different families of trees, even in the same orchard, require different pruning; but, on general principles, particularly in this climate, everything is in favor of training trees low—let them branch out near the ground. There are various reasons why a tree should be trained low, especially in this part of the State. In the first place, we want to protect their trunks from the hot rays of the sun. Nature has provided for its own protection if you will let it. Every tree, when it first starts out, throws out its little branches on every side, not only its foliage, not only to enlarge and strengthen its trunks, but to protect the trunk from the hot rays of the sun. Very many wood butchers will go to work and cut off those limbs close, or train the tree up to a mere spindling switch. The result is, that the body of the tree is exposed to the hot rays of the sun, the stalk grows up slender, is not capable of supporting its own weight, and the tree is a miserable failure. Let those little branches that nature provides for the tree's own strength and protection—let them grow—if necessary, shorten the limbs, cut them back, and by this means you will enlarge the body, strengthen the tree, protect it from the hot rays of the sun, and you will have a much better tree in every particular. Now, there are a great many people who say, I want a high trained tree, because I want to work near it; I want to be able to plow close to it. Now, I think every gentleman here, who has had the experience and been anything like a close observer, knows that I can work very near as close with a horse, to what I term a low trained tree, as you can a high trained tree. For instance, if I allow my tree to branch out low down, all these branches have an upward tendency; you simply have two, three, or four trunks instead of one; they grow up in this shape. Whereas, if you train it up to one stick, until it gets five or six feet high, the branches will have a horizontal shape, will run out at right angles, and, unless they are high enough over your head, no horse, nor the hames on your horse, can go under those limbs, and you cannot actually get as close to your tree, as you can to the low trained tree. In addition to that, and in addition to protecting it from the hot rays of the sun, and the enlargement of the trunk, the tree is more firm, more solid, more substantial and more likely to throw out lateral roots, that will reach out and gather the strength of the soil from different sources. Now, it has been my observation that the tree that runs up straight where the soil is loose and kind below, particularly if it has a loose, kind subsoil, if the tree runs up straight a single branch, the roots have the same tendency to run down. If you have lateral branches on a tree, you are likely to have lateral roots. I will tell you very much the shape of the roots, if you show me the natural shape of the tree. In addition to this, you keep your fruits within your reach, and the tree is better able to bear its weight of fruit, better able to sustain itself, and you can gather your fruit so much easier. I asked a gentleman one time over in Vaca Valley, how many cherries a man could pick in a day. He says: "That depends altogether upon how high he has got to climb after them." He says if a man can pick them from the ground, if his trees are trained low so that he can pick them from the ground or from a very short step ladder, he can pick so many pounds in a day. If he has to pick them from a ladder ten or fifteen feet high, he can pick so many pounds, so that when he got thirty feet high, he could pick about one fifth as many as if he stood on the ground. So that the picking of the fruit, the stability of the tree, the lateral character of the roots, the health and vigor of the tree, are all advanced in favor of low training. The high trained tree has nothing in its favor to recommend it that I can think of. Where I was raised, back in Illinois, I didn't know much about fruit, but every one that had orchards trained them away up high; and when I first came to this country I saw some orchards trained low, and thought how silly it looked, but I have become a thorough advocate of low pruning. There are other considerations in pruning, and different kinds of trees, as I stated before, require different treatment. Now, we will take, for instance, the cherry tree. There are different opinions about the pruning of this tree, and in this, in all that I may say, I simply advocate my theory. I think that as a rule a cherry tree requires but little pruning. Prune it well in the first place, and let the branches come right out within one foot of the ground. If I bought a cherry tree to-day to plant out, and it were seven feet high, I would cut it down to fifteen to eighteen inches and let it branch right out, and after I got the head properly started, of course I would prune it, prune it while it is young. And after I got the head properly started, I would then train it simply to suit my taste until it gets to be five or six years old, and prune it very little after that. I have seen men cut old cherry orchards all to pieces, but I don't approve of it, for I think you will lessen the quantity of your fruit and do the tree really no good. It creates a tendency to throw out water sprouts, and the strength and vitality of the tree goes to wood, rather than to fruit. A cherry tree I would prune very little after it gets to be five or six years old, except to keep it in shape. Prune off awkward branches, and head it back occasionally, but not prune it very much. Now, a peach tree I would treat differently. I would prune it well as long as I had the care of it. I would train it well in the first place, to give it a head to suit me; and then every year I would take out all of the dead, sickly branches. I would cut where the limbs run close together. I would thin out the top, and I would head back a little every year; but I don't believe in heading back too much. There is this difficulty in pruning a peach tree or anything else. If you cut off a branch here it is liable to throw out three or four branches the next year, and if you are not careful—if you head back heavily every year—the first thing you know you will have a regular bramble bush of a top. That wants to be avoided, and to avoid that you want to head back. The nearest rule that I can give will be one third of the new growth every year, and to thin out. Where there are four or five prongs, like this, cut off one or two of them. Keep the top sufficiently open. The peach is a thing that wants the sun. If you want the color and the flavor you want the sun; so you want to thin out to get the sun, and so that the air can get through. If you do not head the peach back the larger portion of the fruit will be near the terminal buds. The weight of the fruit will be on top, and it will have a tendency to break your tree all to pieces. I would treat a pear tree very much the same as a peach, but not so much. I would treat the plum tree and the prune alike. I would not prune it quite so much as the peach. I would prune it some, however, and very much the same as I have suggested. The apple I would prune less; again, I would prune that as I do the cherry, to give it shape, until it gets to be four or five or six years old, and then I would thin out, treating it very much as I would the cherry; perhaps pruning it a little more than that. There is great danger of pruning too much, for if you cut too severely you are liable to throw the strength and vitality of any tree into wood instead of into fruit. The fig tree I have always believed until recently did not need any pruning, only just enough to give it shape; but some experience I have had in the last three years has convinced me that the fig, too, needs pruning. The fig is a very peculiar tree, when you come to transplant it. I would cut any tree except the fig that I was going to plant; I would cut away nearly all the top. I said this at the start, but I will repeat it, because I think it of great importance. Most people, when they buy trees, forget that the best dug tree has been robbed of half of its feeders, consequently the top should be shortened back, so that the roots remaining may be able to support and make a vigorous growth on the top that is left, and they expect half a root to support a whole top.

As I said before, I would cut back very heavily any other tree than the fig; but my observation is that a fig, when you first transplant it, does not need any cutting back; in fact, seems to be an injury. I would head it back some, but not half as much as I would other trees. There is another thing about it that is very peculiar. It is very common to find on a fig when you take it up a mass of fine moss-like roots. You will see some large, heavy roots, and then a mass of fine, hair-like roots. They want to be taken off, leaving only the large and medium sized roots. I will assure you that if you set out the fig tree with that mass of fibrous roots it is liable to die. You will hear many people say: "I lost my fig tree; it died, and I took all the care I possibly could. It had good roots." Now, from some cause or other, I don't know why, that mass of roots seemed to kill the tree. You want to pare them off, and prune it but a little, and then set out the tree, and prune it but very little. Then I would prune it only just enough to give it shape, until it has arrived at the age of, say four or five years, and then I would treat it as I do the cherry tree—I would cut but very little, as it was growing vigorously.

General Vallejo: Do you prune the black fig under the same system as you do the white fig?

Mr. Williams: Yes, sir; I have never treated them any differently—that is, so far as paring off these hairy roots. As I was about to say awhile ago, I wouldn't prune the black fig tree much after it got to be four or five years old, except what was absolutely necessary to give it shape. If it was too thick and compact I would clean it out. If it was inclined to be too open, as some suggest about the white fig, I would try to bring it in; but finally, when it gets eight or ten years old, you will find it is making very little growth, and seems to be at a sort of stand-still. It then becomes necessary to give the fig tree a good square heading back, so as to give it a new start. Some three years ago I had occasion to cut a fig tree all to pieces, in order to get some cuttings of a variety that I wanted, where I had but the one tree of it, and I wanted all the cuttings I could get, and as it was standing outside, I didn't care how much I would cut it. I confess I didn't know the benefit of pruning a fig tree until then; so I cut it all to pieces. I cut off all the wood that was on it down to two inches in diameter. I used cuttings of an inch and a half. That tree threw out an immense growth. It grew in the branches three to four feet, and had a heavy crop of fruit; but that year it did not have what we call the first crop. It had a heavy crop, and that has grown more ever since than the others of my neighbors inside of the fence, where they have been cultivated. And why? Because it needed that renewal; it renewed the vitality of the tree. Now, I would not do that every year; but every four or five years it becomes necessary to give it a severe pruning, in order to rejuvenate and start the new growth. Now, then, if the fig tree, or any other tree, is too close or compact, and does not let the air and sun in sufficiently, why try to widen and spread it out. If it is inclined to spread too much, and you want to draw it in, cut from the outside and leave your buds on the inside.

A Delegate asked for information as to the pruning of apricots; also, the time to prune.

Mr. Williamson: In the nursery I would always have my knife with me. In a young orchard or nursery I would prune any time of the year, whenever I saw a limb that I thought needed cutting off, and in pruning an older orchard I would prune any time in the fall or winter after the leaves are gone. I believe it is a good idea to trim a peach tree, particularly, in the fall, while the leaves are yet on. I think it helps to develop fruit buds, and there is not such a strain upon the fruit. As to the pruning of the apricot, I am a little puzzled. I have tried two experiments. I had some apricot trees once that didn't bear very well and I was told by a Vacaville man that I wanted to cut them back very heavily; that that would make them bear. I tried it and cut them back very heavily. They were Moorpark, and that happened to be the heavy year for Moorpark. You know they bear alternately, and I had a big crop, and thought I had just hit it exactly; so the next season I went at it again and cut it back heavily, and that being the light year, I had no fruit: it all went to wood. I am now of the opinion, after having experimented for two, three, or four years, that the apricot tree, in our locality, does not want very much pruning. I would treat it very much as I would the peach tree, only prune it less.

Mr. Williams: What do you think of summer pruning of the apricot and the peach?

Mr. Williamson: I never tried it. I never pruned until along in the fall, after the fruit was gone; but I believe in that for nursery trees—small trees.

A Delegate: How about the almond?

Mr. Williamson: I am glad the gentleman called my attention to that. I think the almond wants less pruning than almost any other tree except the cherry. I would treat it just about as I would the cherry. I would train it, of course, while it was young, trim it well, as any other tree, and prune it reasonably, until it got to be pretty good size—four or five years old—and then I would quit trimming, absolutely, only to thin out; give it sun and air, and give it shape, but I wouldn't go to work and head it, slash it back as I would the peach tree.

Professor Husmann: I have listened with a very great deal of interest to Mr. Williamson's very correct ideas of pruning, and it accords with my experience. There is one thing, however, which has not been mentioned, about which I would like to hear something said here, what is what I call thumb and finger pruning, or pinching—summer pruning. I have always had the opinion, since I have treated fruit trees, that what we could do with the thumb and finger in summer, when the wood is young and succulent, you need not do with the knife, and that a good deal of cutting out and trimming could be avoided by weeding out the young shoots in summer; and I have always followed the practice of summer pruning my young trees from the start, and I follow it now in the orchard, even on large trees. Where they throw out what we call water sprouts, or suckers, rip them out in summer; that occasions no wound, and does not rob the tree of any strength at that time, and I have always considered that much more beneficial than heavy pruning in the winter or fall. What we prevent from growing we need not cut away, and where we can make two shoots sprout in summer by pinching any young and succulent shoot, and thus making the head of the tree more compact, we need not kill next spring by cutting back that shoot.

Mr. Gray, of Chico: I don't agree with Mr. Williamson about cutting out young fig trees. I will give you my experience this summer. I don't know what the success will be. I had a hundred young White Adriatic figs from the cuttings last year, and cut down nearly to the roots waxing the top over, and a finer stand I never saw. My only fear is that they may not be hard enough to stand the frost of this coming winter. It may be difficult to cut a fig as you do a peach, but cutting them right down to the ground and waxing them, I think will do.

Mr. Williams, of Fresno: To explain the idea Mr. Williamson advanced as to cutting off the roots, we all know that the fig is very soft wooded, and the sap as well as wood is very sensitive to atmospheric influences. Those fine hairy roots are very easily dried up, and after they are dried up, they never come back any more, very much like an orange. In cutting them off he leaves the large roots; they are not so subject to the influence of the atmosphere, but if you do not allow your small roots to get dry—keep it in a moist state all the time—I do not think you benefit your tree any by trimming those roots off, but I think you injure it.

Mr. Williamson: I will answer Mr. Gray first. He didn't prune as we speak in the common sense of pruning, he cut it down to the root, but if he had cut it down same as an ordinary peach tree, he would have found that it didn't do as well as if he had cut it back much less. As to the other matter, I have noticed for years that a great many fig trees that I sold, and that I planted myself, did not do well. They were pretty good trees when I sold them, and I had a good deal of complaint. I was talking about it one day, and a gentleman said to me: "If you had gone to work and cut off those fibrous roots, it would have grown. The fig tree grows from cuttings, and if you take a fig tree and cut off all the roots, all the side roots, you will find it grows better than if you leave all those roots on." I didn't believe in the doctrine, but the next season I tried that very experiment. I cut all the side roots off, and just left the stump and planted the tree out, and then I planted one with all the roots, with this mass of fibrous roots, and the one died and the other lived. And I tried several other experiments, and I find in every case where I didn't cut off the bunch of fibrous roots, that the fig tree didn't do well.

Mr. Hatch: I wish to say this before we end this discussion, that is, there are five things essential to the raising of fruit—first, soil; second, climate; third, cultivation; fourth, pruning and thinning; the fifth is keeping them free from insect pests. Those five things I believe to be the most essential things for us to consider. This subject of pruning has not been thoroughly considered; we have the ideas of one or two, but there should be a comparison of the ideas of many on this subject, and, if we could get the success, or the lack of it, from the different methods by comparison of experiences it would be a great benefit to us.

The further discussion on this subject was continued until Wednesday evening, at half-past seven o'clock.

THIRD DAY'S PROCEEDINGS.

Sacramento, November 17, 1886.

The Chair announced the topics for discussion for the morning hour:

1. The care and selection, the kind and size of packages in marketing and shipping.
2. The proper time to gather the different kinds of fruits, the curing, etc.

Professor George Husmann, of Napa, read an essay on the best grapes for table and market; also, essay on the quince, as follows:

THE BEST GRAPES FOR TABLE AND MARKET.

Mr. President and Gentlemen: You have assigned to me a task which ought to have been given to some one more able to do it justice; for, although familiar with the grape and its culture, I have generally only had wine making in view, and studied the best varieties for that purpose. All you can expect of me then, is to open the subject for a discussion by those who have been growers and shippers of this delicious fruit, hoping to learn therefrom more than I can teach.

That the subject is one of vast importance to the State, no one will deny who has watched our markets, as well as the shipments East, and the high prices which are yet obtained for choice California grapes there. Being somewhat familiar with the markets there, I am satisfied that California grapes will always sell, as it is impracticable to grow the European varieties there in the open air, and these are so different from the native varieties in their flavor, texture, and appearance, that many will prefer them even when the markets are crowded with Catawbas and Concords, provided they can be had at reasonable prices. But they will pay best late in the season. We can hardly compete in earliness with some of the natives, grown in the more southern States, and as Virginia, North and South Carolina, and Georgia can grow excellent grapes, bring them to market early, and with lower freights, our main object, in my opinion, should be to grow late varieties of attractive appearance, and firm texture, so that they will arrive in good condition, and keep even some time after their arrival. With such, and reasonably low freights, we can have the entire territory west of the Rockies as a market.

Among these the Flame Tokay seems to take the lead, on account of its late ripening, fine color and appearance, and its firm texture. The only drawback seems to be its liability to sun-scald, and its somewhat unequal ripening in some localities. It is a very strong, vigorous grower, and always commands satisfactory prices from the grower to the dealer, as $40 per ton were paid for them in Upper Sonoma Valley, the grower picking them into common grape boxes, and the buyer paying for the packing, sorting, and handling. This, of course, is outside of the clippings and refuse, which is generally sold to the wineries, and makes a very nice white wine. I was told by Mr. Robert Hill, to whom I am indebted for most of this information, that three tons per acre of marketable grapes are about an average product, which would bring the returns per acre, including the refuse, to about $150. The tendency to sun-scald could be overcome, to a great extent, I think, by early pinching of the fruit-bearing shoots, which will have the effect to make the vine throw out more laterals, grow more compact, and thus shade its fruit better.

Among the late ripening black or dark colored varieties, the Emperor, Black Cornuchon, and Black Ferrara seem to be the favorites, as they are loose in bunch, the berries of large size, and the long, firm stems seem to hold the berries well, so that they arrive in good condition.

Of the white varieties, the Muscat of Alexandria, the Verdal, and perhaps the White Cornuchon seem to be the most in demand, but the general impression seems to be that white grapes will not bring as good prices as colored ones.

For nearer and home markets, the Malvosia, Rose of Peru, and for early marketing, the Early Madeleine, which ripens full ten days in advance of the Chasselas Fontainebleau, will always be in demand, although they often come down to such low figures, that it will hardly pay to pick and pack them.

I also think the Grosse Colmant a variety to be recommended, as it is very productive, has splendid foliage, and therefore is not liable to scald; has a uniform bunch, very large berry, of fine color and appearance, and ripens evenly and late. Whether it is firm enough for distant shipment remains to be tried. It certainly deserves a thorough trial.

That soil and climatic conditions should have due consideration in the choice of varieties is self evident.

With these few remarks, Mr. President, which I hope you will consider only as introductory to a discussion by abler heads, I will leave the floor to them.

THE QUINCE AS A MARKET FRUIT.

Mr. President and Gentlemen: The above subject was given me at your last meeting, at Los Angeles, because I seemed the only one who believed in this almost forgotten fruit, and its value for exportation. Perhaps I may look at many of our industries with different eyes, and a more eastern standpoint. I believe that the days for making fortunes in a few years from our vineyards and orchards are past; that we will have to content ourselves with fair living profits. Instead of making from $1,000 to $1,200 per year from an acre of apricots and French prunes, we will have to be satisfied with from $100 to $300; and that such fruits as will yield a sure crop every year, and of the least perishable nature, such as will stand transportation best, and give moderate but certain returns every season, are the safest to tie to. I also believe in mixed farming; in dividing our large tracts into small homesteads, and planting them with a variety of fruits, such as will come in at different times, thereby distributing labor over the whole season, instead of running one specialty, and crowding all the labor into a month or two, is the only true solution of the labor problem in this State. Put a thrifty family on a hundred or even fifty-acre tract, where they can raise their own animals and feed for them, and a succession of fruits, a few acres of vineyards, so as to give the members of the family employment the year round, with one or two steady laborers to help them, and we will come nearer to settling the vexed labor question than by all the Restriction Acts and anti-Chinese leagues. But pardon this digression, which I hope to show is germane to my subject before I come to a close.

Since I have been in this State, I have noted with pleased surprise the marked success of the quince everywhere, with and without irrigation. Although led to believe formerly that the tree succeeded best in low, damp ground, I have seen it flourish and bear well even in dry soil, and producing a uniform crop of good sized, smooth fruit. Having cultivated it and dealt in it in Missouri for thirty years, I can safely assert that such quinces as we can raise here are far better, and can be grown cheaper than Missouri or the neighboring States can produce them, even if the freight is added to their cost here. I have often found it difficult there to obtain them at all, and have had to charge my customers as high as 50 and even 75 cents per dozen for fruit not near as good as the average here. If we sum up its advantages, they seem to me the following:

1. They can be grown almost anywhere, and as they are very hardy in their bloom will produce a sure crop every year.
2. They are less liable to the ravages of insect pests than almost any other fruit, and diseases of any kind.
3. They ripen late, and can be marketed and shipped when other fruit is out of the way.
4. They are less perishable, can be packed when still green, and will ripen perfectly on the way. They can be shipped as common freight, so there is less risk and cost in their transportation, and will not suffer if "sidetracked" for several days in transition.

These are my own impressions. But I know you want something more than assertions, and therefore I interviewed Mr. Howe, of Sonoma, the only one whom I know of who has made the quince one of the specialties in fruit growing, and he kindly furnished me the following data:

He has a quince orchard of twenty acres, about two miles from Sonoma, planted nine years ago, with three thousand two hundred trees, sixteen feet apart. They have had a good deal of fruit before, but produced the first regular crop in 1885, about two thousand four hundred boxes. These were partly shipped to New York, partly to St. Louis. The shipments to New York cleared 48 cents per box; those to St. Louis 61 cents per box. This season he estimates his crop at six thousand four hundred boxes, or two boxes to the tree. Has shipped some to New York, some to Chicago, some to St. Louis, but the returns have not come in yet, and he has a good many still on hand, which he is shipping to San Francisco, where they have so far netted him about 40 cents per box, which he considers fair pay. Eastern markets are somewhat glutted, he tells me, as New York has a big crop, but his commission men write to him that he could have obtained better figures if he had shipped a week earlier, which he could easily have done, or even two weeks. Have always arrived in good condition, and kept well. Taking this season's crop as an average product, and taking into account that it is a new industry, which can be improved on by studying the best time, the best markets, etc., I think this very encouraging, and draw from it the following conclusions:

A quince orchard, if properly cultivated, will pay cost of trees, planting, and cultivation by the time it is six years old. From that time until its ninth year it will pay at about the rate of $50 per acre, valuing the product at 50 cents per box net. From that time on, its average product may safely be put down at $1 per tree, or 50 cents per box net. This would be at the rate of $160 per acre. Deduct from this $60 for cultivating, packing, and handling the fruit, interest on capital and land, which is certainly a high estimate, would leave a clear profit of $100 per acre. It seems to me that this is a very fair profit.

We must also take into account that it is rather a new industry, and the ventures made so far are mere experiments, which may be greatly improved upon, as soon as we know the facilities of the markets better, and take advantage of the best time of shipping, etc. As the eastern trade seems to require earlier shipments, other and earlier varieties than the orange may prove more profitable. There are a few trees on the Talcoa Ranch which have annually produced heavy crops of the finest quinces I ever saw. They are much larger than the orange, frequently measuring six to eight inches in diameter, ripen in September, round and smooth, fine golden yellow, and make very high flavored, deeply colored jelly and preserves, as they cook and stew very tender. I believe this would be an excellent variety for early shipments. I do not know their origin, nor their name, but would recommend them for trial, at least. Perhaps it is the same as a seedling originated by Mr. West, at Stockton, of which I have heard him speak. To sum up, I would recommend this hitherto neglected fruit for a better trial and more extensive cultivation than it has received so far, and believe that we can always find a paying market for it east of the Rocky Mountains.

Mr. Shinn: I would like to ask one question of Husmann, or any one else. Is there any probability that large quantities of the quince can find a market anywhere in the world? I have grave doubts as to that matter. We know that almost any of its varieties succeed admirably, but I have hesitated to plant many of them for fear of difficulty in marketing.

General Vallejo: Mr. Howe, of Sonoma, planted, about seven years ago, four thousand quince trees, and two months ago he sent to New York, St. Louis, and Chicago three carloads of quinces, and last week he sent two more.

Professor Husmann: I have referred to Mr. Howe already in my paper. Most of the information I read there was obtained from him. He tells me that he is very hopeful of a market, though so far they have not paid him any excessive profit. I have always seen a lively demand for the quince in what we used to call the Western States—Illinois, Missouri, Kansas, Nebraska, and all those neighboring States—and I have no doubt large quantities could be marketed there. That we cannot find a market there for all we can grow in this State is self evident, but I think that one of the advantages the fruit offers is, that it ships so well and so easily. As to its general use, I believe that there are few housewives that would like to do without the quince in some shape or other, either as jelly or preserved fruit, or even as dried fruit, and I think its uses could be vastly multiplied if the impetus was once given. Even a few slices of dried quinces among some stewed dried apples or pears give them a flavor which, to my taste, is very desirable.

Mr. Wagenseller, of Ukiah: Before I planted out my apple orchard I conceived the idea of planting quince among them, and planted quite a number, and find that there is quite an advantage, not in the quince, but in the bloom; it attracts the codlin moth from the apples. That is the only advantage that I see in it. I am now debating in my own mind whether to leave them there or to dig them up.

Mr. Shinn: This matter was brought up in the State Horticultural Society more than once, and our good friend, Mr. Jessop, who is now no more, one time spoke of endeavoring to ascertain what the manufacturers of jelly really used, and he found that the currant jelly had almost no currants about it. That the quince had almost no quince. That the great basis of almost all jellies was apple juice. They could buy the poor, wormy apples for almost nothing, and form the basis of their jelly of that material, slicing up a box of quince, perhaps, in a great quantity of apple juice, and thus make quince jelly; and I know of more than one housewife that does the same thing. It is the flavor of the quince that is most palatable. Who wants a jelly of pure quince? So, the market is very light; therefore, I come to the conclusion, while I should be very glad to sell a few thousand beautiful quince trees to anybody, I doubt whether it would be advisable to encourage the large growth of the quince. My experience also, is, that the codlin moth will leave the quince severely alone, if he can find good apple or pear trees.

Mr. Block: If I should be asked by any one whether I would advise them to set out a quince or not, I should say don't. Professor Husmann has quoted to us some large prices paid fot the quince in Missouri. I sent some last year to Missouri, where I supposed there was a market; realized neither 75 cents a dozen, nor 75 cents a box, nor even 5 to pay for the box in which it was packed. That is my experience of last year's shipment, and I doubt whether Mr. Howe will, when his returns all come in from his eastern shipments, be able to show any satisfactory results.

DISCUSSION ON FRUIT PACKAGES.

Mr. Hatch: In regard to the size and kind of packages, that is something that will be settled by demand, but uniformity at least is required. A package for peaches, for apricots, for plums and prunes, and grapes may be, with very few exceptions, all of the same size. Then the commission merchants will have a definite idea of what they should get for a box of fruit in a peach or apricot package, but if the box is of length, width, or thickness less than another of the same quality, then comes the question how much is this box of fruit worth, whereas all boxes of the same quality would be supposed to bring the same price if they were of the same size. That is where we make a great mistake in putting up our fruit in different sized boxes. Some seem to say: "I will take a box a half inch thinner; it won't take so much fruit. I will get the same price. I will fool somebody." They don't fool anybody except themselves. Those men who buy this fruit, as a rule, have bought fruit before, and they know just about the amount of fruit they should receive for so much money. The most of our fruits either go East or to the canneries; they don't buy by the box, as a rule, and will not, unless of the uniform size. They want to know practically how many pounds they are getting for so many dollars, and they do; and I think we would benefit ourselves, and all connected with handling our fruits, by agreeing upon some uniformity of package for the different varieties of fruit, and have it established. Some say they cannot put all kinds of the same fruit in the same kind of box; some are too large and some too small. Now, I don't know about that. It is true if you have very large peaches you can't get two tiers in a four and a half or five-inch box; maybe you will in a six-inch box. You can't get two full tiers, one right on top of another, but you can take and jog it and you will get about as many pounds, and they will carry better than if they were packed on top of one another.

In an endeavor to get a preference for the sale of my own fruit, I got a larger box to sell for the same price, thinking that my fruit would sell a little quicker than the other man's, and the advantage that I would gain would make up for the extra price of the box, and the extra quantity of fruit, and it paid me well. At the same time, if we have a uniformity of box, it would be far the better for us all. There are only a few kinds of boxes needed for all our fruits, about three sizes is all that is necessary, except for berries.

MR. WAGENSELLER: Would you have the same size box for the apple and the pear; pears are 20 per cent heavier than apples?

MR. HATCH: It will certainly become known how much heavier they are; it is the custom here to put apples and pears in the same boxes.

MR. GRAY: There are many here who have had more experience than I in packing, but we all know that it is one of the most important parts of fruit growing—the selection of the fruit to be packed; for just as surely as you pack thoroughly ripe fruit with fruit not in a ripe condition for long shipment, both are ruined; it has got to be done with the greatest of care. This year the experience of shippers has been very serious. In some cases where we have packed with all the care possible, owing to the long time, perhaps, that they have been on the railroad, they were spoiled when we supposed they were in first rate condition. The hot weather of this past season has had a great deal to do with the fruits spoiling, even when well sorted and packed.

MR. BLACKWOOD: This question of boxes has been up year after year and doesn't amount to anything. I find that it makes but little difference the size of the boxes the commission man receives; he gets what he can for it, that is, if he is honest. The canner, whô buys nine tenths of the fruit grown in California, buys by the pound, so I think this is a matter of comparatively little importance. What I would like to hear about is as to preparing fruit for shipment to the eastern market.

MR. THOMPKINS, of Alameda: It is time to make some improvement in this matter, and if it goes on as it has for so many years we will never succeed. In almost every car of fruit packed this year there was trouble with the boxes; some would use one kind and some another. I think we had better have a committee of fruit growers, who can interview the commission merchants, and can then have models of the size of boxes deposited with the Horticultural Society during the winter, and they can be sent to the packers and the Fruit Union. Then we will have a fixed standard.

MR. L. W. BUCK: The question of the size of the boxes is quite important, especially for eastern shipment, and for that alone. Because we have men in this State, as fruit growers, that imagine themselves a little smarter than anybody else, and, as Mr. Hatch said, they want to cheat somebody, and consequently they will have a box that is half an inch narrower, or smaller one way or another, so that they will not hold quite as much fruit. I don't exactly agree with Mr. Hatch in reference to the size of the box for our local market. I think we should have a box that will answer for the pear box and peach, or a plum box, and they should all be of uniform length and width, but not in height, so that they can be put in the same tier together. They need different sized boxes for different kinds of peaches. Commencing with early peaches, a four-inch box will do, and then as peaches get larger, later in the season, it requires from that up to even a six-inch box. A peach should have a box that is high enough, so that there is no pressure on the top and bottom of the peach; the cover should stand clear from the peach, that is—I am speaking now of eastern shipments—so that the cover does not touch the fruit.

The grape crate has usually been considered the thing to pack grapes in, and in fact many of the smaller plums and apricots have been shipped in crates, and generally, I think, they have sold better; that is, for enough more to pay the additional price between the box and the crate. I was down to San Lorenzo to help load the first carload of cherries that was shipped from there, and I think there must have been at least a half dozen different sized boxes to load in that car, and I assure you it was no small job to get them so that they would fit in. That is certainly a matter that should be considered by every man that intends to ship anything East, to get a uniform box, so that the fruit can be loaded readily.

One great trouble of getting uniform boxes, I think, lies very largely with the growers themselves, from the fact that they do not know how many shipping boxes they want to use and let it go until the last moment; then they have got to go to the nearest box factory that they can reach by telephone, or telegraph, for so many boxes, and they have to take what they can get.

Mr. Blackwood: Will you give your idea of the manner of packing the fruit to go East, and what fruits ought to be packed with paper, or how packed.

Mr. Buck: Well, almost everything should be packed in paper; plums, if they are packed in crates, do not need wrapping, as they do in boxes. If they are packed in crates, you simply lay a paper in and lay a tier of plums or apricots in, folding the paper back, and you take a long strip of paper and lay between each of the tiers. If they are packed in boxes, my plan is, that all fruit should be wrapped, except grapes. As some one has said, this year has been rather a disastrous one in shipping, and, of course, there may be those here that have different explanations for it, but, I believe, one of the main reasons has been that much of our fruit has not carried as well this year as in other years; probably from the fact that the ground was very wet in the spring, and it came on and ripened very quick, and further, that the weather during the time that the main part of the fruit from Central California was shipped East, was very warm. It left here warm, and was warm all the way across the continent.

Mr. Blackwood: How many plums do you get in a crate?

Mr. Buck: About the same as in a box; there are four little baskets to the crate, making about twenty pounds.

Mr. Thompkins: It seems to me that if we have a regularly established size, the box maker can keep them in stock; as it is, they have not the slightest inducement, because, every order that is given is for a different size or different shape box. I will move that this committee be appointed now.

Mr. Hatch: I move to amend, so as to provide for the appointment of a committee to decide upon some uniform packages for fruits for local and for eastern use, and such reports to be left with the box factories, as the judgment of the convention.

Carried.

Mr. W. M. Williams, of Fresno: The people in our county have had the same trouble in regard to the boxes, but they have now happily established the uniform box, which packs well in the car, either endways or across. They hold exactly twenty pounds. A man gets a box of raisins East; he knows what is in it. There is no eighteen or twenty-one pounds. The Spanish people have also adopted our box, and instead of packing twenty-two they pack twenty pounds. I have had a little experience in packing grapes. I have found trouble there, as our folks in packing here don't pack them full enough. Owing to the settling between here and the other side our baskets of grapes are only half or two thirds full when they arrive there. The dealer looks at them. When he sees that he will offer you 50 cents a crate, when, if that same crate were well rounded up, you would, perhaps, get $2 50 or $3. That is the great difference. The grapes may look as well, and lack only a few pounds of being up to the standard; but it makes at least 50 or 75 per cent difference in the price. This year, in packing my cars, instead of putting the cleat, as we have, on top of the box, I have nailed it under the bottom, so that I could round up my crates, and my returns have been fair; and I believe there is quite a point in filling these crates, so that these baskets, when they arrive, had that rounded and full appearance. I have continued shipping, and have one car that went forward day before yesterday, and one the Wednesday before, so as to make Thanksgiving pleasant for them over there. That is one great difficulty with our packing. We try to make the box look full, and hold the fruit up, but when it gets over to the other side it is down. The settling brings it very compact. The consequence is it makes a very bad appearance when it arrives; and my experience is that we should pack in single crates, though they prefer the double on the other side. I don't know why. It costs us more to put them in single crates; but the evaporation and rising of the heated atmosphere and moisture from the grapes, I think, is bad for the upper crate.

Mr. Buck: The last year's (1885) experience was in favor of the single crate, for of the amount that we shipped East two single crates outsold one double crate the whole season through. This year, I think, the chances are it has been the other way. Why it is I can't say. Of course, a commission man would rather sell a crate than a half crate, because it is no more work to sell it, and it brings, generally, twice the money, and he gets twice as much commission. Now, in reference to full packing, I agree with Mr. Williams that grapes should be packed as full as they can be, but with many of the grapes that are packed and shipped from the central part of the State here, they are not, and unless they are pretty well wilted it is oftentimes a very difficult matter to get full weight in the crate, especially of the early varieties, without pressing so hard as to bruise them, and I think that pressing so hard as to bruise them is really worse than to send it light. We have here one of the most noted packers of the State. So far as I have seen his packing, it is the best I have ever seen, and I would like to hear from him; that is Mr. Rutter.

James Rutter, of Florin: I have been packing grapes principally ever since the railroad was constructed, and I have sent grapes in different shapes through to Chicago and New York. When we started, I remember I loaded two cars of grapes for Mr. Reed, and packed some in cork dust boxes that held thirty to forty pounds, about the size of the pear boxes, and we packed some in small boxes, about five pounds, a few square boxes—no baskets then—and we also hung some in what we called the hanging crate—slats across the top to hang the bunches upon. That did not prove to be a good way of packing. The jarring would cause them to shake down, and it proved to be a failure, but the cork dust was very successful. I never had any complaint whatever with them, and I think they would keep an indefinite time. The grapes in small boxes, similar to the baskets we are shipping in now, went through in very good order, but they could not be depended on to stand very long after arriving at their destination;

you are subject to the mercy of the speculator. With the cork dust you are independent of them; they are continually in a fresh condition.

Mr. Williams: I would like to ask what was the fineness of the cork dust.

Mr. Rutter: It was similar to the fine sawdust of the mill, as near as I can describe it.

Mr. Block: What did it cost?

Mr. Rutter: I think about 8 or 10 cents a pound at that time. That was eight or ten years ago. After a change in the prices of grapes I found it would not do, and the shippers attempted to get five pounds in a basket of four and a half inches in depth, really sized for four pounds; consequently when they got to the other end they were damaged; but I made them four and seven eighths inches instead of four and a half, and then I put my five pounds in, and they would go in good condition, providing they were carefully packed.

Mr. Williams: I had my boxes made at the Union Box Factory, and had them five inches instead of four and a half.

Mr. Rutter: With some kinds of grapes that would be well. I would recommend cork dust if we could get it, or a substitute. I remember about 1853 and 1854, we received only grapes from Los Angeles, and they came here about this time of year, and later, in sawdust; boxes that held thirty-five or forty pounds. They came in very good condition. They were also teamed across the mountains into mining camps about that time, and I remember that they were hard through that part of the season. I should like to hear from some gentleman regarding the process they used, whether they prepared their sawdust or not; it was redwood sawdust.

Mr. Butler: The Almeria grape, that is used so much in the East, is what is called the Malaga grape. It comes packed with sawdust. I think that is where they meet with success, and why it has been that we are unable to compete with them because of their superior packing. The experience of the gentleman seems to corroborate that idea. Cork dust is very expensive; and there is a gentleman present that has made some experiments with ground tule, just like sawdust. I refer to Mr. Gray.

Mr. Gray: I think Mr. Williams has had more experience. I had some prepared, more to see what the substance is like; and I believe it is going to take the place of all the other packing. I feel encouraged to think that it will be better than paper. If any one has tried the fruit that has been wrapped in paper during the past summer, wrapped when it is hot, and standing six or eight days, he has found the fruit tastes very much of the paper; and unless there is some substance of that kind to take the place of it, the paper is going to be the ruin of the fruit.

Mr. Williams: I am now experimenting with cork dust, and also with tules, not ground up, but cut up very fine in a cutting machine, that makes it something like very fine-cut tobacco. I will be glad when my grapes are opened—they are not as yet—to give all the information and experience I have to our fruit packers; but I believe it is going to be a success. It is tasteless, very elastic, and a great absorbent; and if it does not succeed I will make arrangements with some of the eastern houses that are importing cork dust to get it here very cheap; perhaps less than $3; and a pound of cork dust goes a long ways in the packing of grapes. While we are on the subject of the packing of grapes, I have had experience with the Malaga, that is mentioned in Professor Husmann's essay, and is a very superior packer; in fact, they are equal to the Emperor, and far superior to the Cornuchon or Tokay. The great advantage I have found in them is that they do not break loose from their stems, as the Muscat, but as the stem dries up they seem to adhere to it. You take a bunch where the stems are perfectly dry, and shake them. They do not shake off; they seem to contract around the stem, and hold perfectly tight. They are an enormous bearer. I had some seventy-five pounds on a vine, yielding from eight to fourteen tons to the acre, and they ripened very late. I have them at home now, and they are in good shipping order. I shipped two carloads in the last ten days; and I think we should all know of these good varieties for shipping. I do not know as it is the same as the Almeria or not; in fact, it does not look as their grapes do, which, perhaps, is caused by the difference in gathering, ours being much riper than theirs are.

Mr. Buck: I would state, in corroboration of what Mr. Williams says, that there were two hundred crates sent up to be loaded here in Sacramento about the sixth of October, as, for some reason or other, they did not have enough to load a car. They had very rough handling in coming here; in fact, some of them were badly broken, but the grapes, almost without an exception, were in perfect order when they got here, some three or four days from the time they left Fresno.

Mr. Blowers: I have shipped the Almeria for some twenty years. I do not think it is what Mr. Williams speaks of; it is quite a shy bearer, and the character of the grape tells why the Spaniards have such good success in packing; they are essentially a winter grape. You can pick them and lay them away on any shelf, giving them the ordinary ventilation of a room like this, and you can keep them a hundred days. If you want to experiment with that variety, there is no doubt you can make a success of it, because you can ship them to New York, and they will keep after you get them there; but if you want to preserve the Muscat or any other grape like that in cork dust, or any other way, you will make a failure of it.

Mr. Rutter: I want to say, as to the Mission, I see that by the papers they are denounced, but I have made more from my Mission grape than any other I have got. Martin, of Denver, used the grapes, I think, for five or six years late in the season, and puts them in baskets and keeps them there for an indefinite time in that shape, and I also keep them at my place an indefinite time, and, coming later than the other varieties do, I get about the same price that I do for the luscious summer varieties, and I think that in the near future they will be sought after as a shipping grape. I am aware that a great many are destroying their Mission vineyards, and I think they will miss it. I will also say that parties from St. Helena chose to come to Sacramento, where there are more Mission grapes than there are there, in order to get the richest kind of grapes to make their brandies and port wine, and sheries, and so on. Mr. Nevis, I have understood, of the Eagle Winery, prefers them for certain classes of wines to any other grape.

Mr. Butler: I want to ask Mr. Blowers, is the Almeria grape a profitable grape?

Mr. Blowers: The only objection to raising the Almeria in my neighborhood, is on account of its not yielding well. It is a vigorous grower. Some years it bears scarcely at all, and the best years not over ten or twelve pounds; that is in my neighborhood, but in other neighborhoods, perhaps in Mr. Williams', it may be adapted to the soil, as I know they grow a good grape in his neighborhood called the Malaga, which is a vigorous grower and a very great producer. He has described that more than he has the Almeria.

Mr. Weinstock: In reference to the question of packing, the facts that forced themselves on my notice while in the eastern market, was that there is a sad lack of conscience among many growers on that point. Some growers endeavor to work on the theory of giving the least possible quantity for the money they expect to receive in return, and as Mr. Hatch remarked a few moments ago, it usually reacts upon themselves. Mr. Watson, the agent of one of the members of the firm of Porter Brothers & Co., called my attention to the condition in which many boxes arrived. When on the scales I don't think they would weigh over twenty pounds, when they should weigh twenty-four. The result was, the buyers are very shy in purchasing those goods, and will only buy them at their own figures. It creates a feeling of distrust and lack of confidence in the integrity of our methods of packing, not alone towards those packers who pursue those methods, but also injures the packers who are more honest, more conscientious; and the only remedy that I know of is this, and it can only be carried out if there is unity of action at this end: that certain regulation must be established governing the size, the quality, and the weight of boxes, and that such officers must be appointed by such organizations as may be created, who will enforce these regulations, and whose duty it will be to reject all fruits that do not come up in quality of packing, or in weight, or in quality, to the regulations that may be established. Unless this is done, I can see no remedy in the future; and the conditions hereafter are likely to remain as they have been in the past, which certainly are very sad in their results.

Mr. Buck: Did you see any evil effects from overpacking?

Mr. Weinstock: Yes, sir; that was also noticable. Where the crates had been overpacked the pressure of the cover would crush some of the upper layers of grapes, and they would begin to decay. Decay is evidently very contagious, and it would have a very bad effect upon all the grapes in that broad basket; but of the two evils I should consider that the lesser.

Mr. Hatch: There was an effort made in the direction the gentleman suggested a year ago. It was that there be a general superintendent in this State to superintend, through his foreman, and the packers selected by that foreman, all the fruits that went East under the same system that an individual would do for himself, and that all the fruit, as near as possible, taking location into consideration, should be alike, and packed alike. It was supposed that that would put only good fruit on the eastern market and get the highest price for the fruit, subject only to changes of weather, over which we have no control. There was an effort made last year to have that part embodied in a union of fruit growers in the placing of our fruits upon the eastern markets; that was one of the principal points.

Mr. Rutter: Speaking of packing, Mr. Reed, I think, yesterday, was saying that the best way that he found to pack grapes is, to have a square box that will hold about twenty pounds without the basket; and let the box be about an inch to the top lid—not full. There is a variety of experience. Now, in packing grapes, it is a nice point; you cannot jump and learn it—you have got to grow to it. Sometimes, I have occasion to be on the outside and see parties pack, and I caution them. There was one instance where they said that a party had been packing grapes for years, and when they arrived there, I put them on the scales, and the shortage would be three pounds and a half in the twenty pounds. Another party said he thought he understood packing grapes; so he brought the grapes. He said, "There is good measure, I will assure you." I sent them to Martin & Co., Denver, and he scored me particularly; he said he did not want anything of that kind—it was a damaged lot—they came all in the pulp, and he had to throw them away, but I had to stand it. The only way that I know of is, for a person of experience to have a little scale, and adjust them at twenty pounds, and then when the receiver receives them, he will know what he is selling. Every crate of grapes, as I understand, in the Denver market, is sold by weight, and not by the crate, and I would advocate every person in packing grapes to adjust every package on a scale.

Mr. Gray: I tried a square box this year, a package which I thought would carry grapes better than the basket. It was a twenty-pound box, with a division in the center only about two inches deep. I selected the more spreading bunches, so that they did not press. They went through the union, and the report was, that it was not a package that would be satisfactory to the market. They did not say it would not keep, but it was different from the packages they were selling; but my opinion was that something not as big as a basket would be better. If Mr. Buck can tell us anything about that certain half carload, or so, I would like to know more about it.

Mr. Buck: I will state that all I know about it is the telegram we received on the receipt of the car, saying that "the packages were not desirable," or something to that effect. I don't remember any letter about it. I want to say a little more in reference to my friend Rutter. I have seen a great many of his grapes packed, and I certainly would advise or say to any man in the whole community, that they can take lessons from Mr. Rutter. His grapes have been the finest packed grapes that I ever saw, without any exception; they are the most evenly packed. I have seen a great many of his grapes this season, and I have never seen any that come up to his packing. I think what he says in reference to the scale is very important, and in packing grapes, if the packers had a scale right at hand and weigh each package, it would be time well spent. There have been a great many grapes sent East that did not have fifteen pounds of grapes in the crates. There have been others sent with twenty-two pounds, and the medium of twenty is generally accepted as the desirable amount. Fifteen pounds is much too low, but if you get much above twenty, you will be getting too many grapes, so that you will have to crush them to get them in.

Mr. Thompkins: We are told that a twenty-pound package will lose three pounds in weight in shipment, and when we are paying from $400 to $600 a car freight, it might be desirable to pay the freight on the weight at the other end.

Mr. Buck: The car is weighed in Sacramento. I do not know how you are going to avoid paying on the shrinkage; for when it is not weighed at Sacramento it is weighed at the first weighing station on the road.

Mr. Block: I have paid a good deal of attention to the packing of grapes for several years, and I never heard any complaint of those grapes; on the contrary, I have always had favorable reports of them. I want to direct attention to the shape that I pack grapes for the purpose of shipping, that whenever a grape falls off, or is wet, they should cut off, with a pair of scissors, the part from which the grape drops off, and see to it that the grape is entirely dry when it is being packed. If there are any grapes bruised, or that have fallen off from their stem, cut that stem off entirely, because it leaves a wet spot there which is liable to mildew others. The grapes put in the basket have got to be entirely dry. This is a very important matter in picking and packing the grape. Further than that the basket should be filled all around, even if you have got to break bunches to fill it thoroughly; put in small bunches on the sides and crowd them full. Those that I refer to were probably among the best grapes that left the State, and I never heard any complaint about their shipment, or about the weight, and that is my mode of doing it. I think some of my friends here are censuring the farmers rather severely, in saying that there is a dishonest motive, a dishonest purpose, in packing grapes. Now, I have seen people that have put up grapes with no intention whatever of wronging anybody, but they have some new help that don't understand it, and they pack up the basket full and don't crowd it on the sides sufficiently. Wherever such a thing occurs it is not intentional on the part of those who have fruit, or our packing. I am satisfied that a great deal of that is done through carelessness or thoughtlessness. This matter of putting the grape in the basket is very important, and should be thoroughly considered.

Mr. Blowers: In reference to my method, I never pack mine until after the dew is entirely off; then they are picked and stacked up in such a way that the air has free access to them for three or four hours. Then I have them in a large, airy room, and have five or six men pick off the imperfect grapes, and those that have become torn at the intersection of the grape and the stem. They cut off everything that is imperfect, and then they are packed by the packer in half flats. Then the basket is placed over this frame—there is a movable bottom—they are passed up into the basket, turned over carefully, and the basket placed on a scale. The scale is graduated to weigh five pounds, four ounces. If it weighs from three to four ounces more than that, all very well; if it is too heavy, some are taken out, because of the pressure. Then when they go East they are in first rate condition.

Mr. Butler: Do you use four and a half inch boxes?

Mr. Blowers: I have been furnished four and a half inch, and I always object to it; and, as Mr. Williams does, when my basket will not go in without crowding, I can put the slat on the under side. That can be avoided by making the crate deep enough, so that it can be filled without too much pressure. The basket should be deep enough, so that it may be uniform. The basket is often over full when it starts. If it is thoroughly wilted, it is still over full, but it should not fill the crate too much. The crate should be large enough so that when the basket settles down, it will be evenly full and the pressure not too great on the grape.

Mr. Williams: I would like to ask Mr. Blowers how long it takes six men to select and trim a carload of grapes.

Mr. Blowers: Six men to each packer, and I have four, or five, or six men packing. It is best to employ thirty or thirty-five men in packing a carload of grapes, so that when you begin it is a continuous operation with one car. If it is a double crate, I fill it half full and place it in position, so that it is being ventilated, and pack the lighter part of the car, and do not begin nailing until the last three or four boxes, before they go into the car, and place the baskets on the drying traps, and place them around the room, so that they shall be ventilated, so the wilting process is going on all the time until three hours previous to the loading of the car; then I begin and put the top four baskets in the crate, nail them up, and send them to the car.

Mr. Rutter: I will give you my method of picking and packing. When we first started in we wilted our grapes one to two days, supposing they would not dry any other way; then we adopted picking them after they were dry; start in, in the summer season about nine o'clock, when everything would be dry. I pick them in a box that will hold twenty pounds when even with the top, expressly made for picking. It has a handle, which is made with a spring, to catch the box; you bring the box up and take the handle off as quick as you can think almost, and put it on another, and it makes a basket. I pick them in that shape, and bring them right in and pack them up right on the other, and then, as Mr. Blowers says, about six or eight men to pick over for one packer, and then pack them as soon as possible and adjust them. I do not pack only in single crates; double crates I believe to be a failure, for the very reason that they are not made accurate enough and strips very often become too short, and when men are putting the strips in, if they are too short, they go right down on the first tier of grapes and the next tier crushes them down. That is very often the case, especially when you are in a hurry, and sometimes we have got to be in a hurry. I would recommend the single crate, made to hold four baskets in a crate, and pack your crates with the baskets in the crate, instead of packing each basket and putting it in afterwards, because every time you take your basket up it is susceptible to pressure, and it will press against the grapes. Instead of wilting, as we used to, I recommend to put them as quick as possible into the basket and into the car to be on their way, for the very reason that when you cater to the million you have to get everything in apple pie order in as fresh a condition as possible, because they will sell readier than if they were wilted, and when they are packed in four baskets. I pack one on the other, ten high, so that, of course, they come from, say a half to an inch above the top of the baskets, above the top of the crates proper, and it will press it down a little; then, after they are about ten inches high, the man that nails on the lids takes them, takes the top first, then they go to the bottom, so that they will get a pressing; then you can see if there is any mashed, and you can pick them out; when you nail the lid on, you are sure there is nothing mashed under the lid. If you take the grapes directly from the packer, when they are raised directly above the side of the crate, and you put the lid on, there may be a mashed grape, and if there is, it will contaminate the other grapes so that when it gets to the other end it will make it disagreeable to look at.

Mr. Weinstock: I should like to ask Mr. Rutter how many boxes an average packer can pack in a day.

Mr. Rutter: About one hundred and fifty single crates.

Mr. Weinstock: The maximum might be as high as two hundred?

Mr. Rutter: If a man was an expert and he owned the institution he might pack three hundred, but you will find a good many more that will pack about a hundred.

Mr. Weinstock: What do you estimate, with an average crop, the cost of picking, assorting, packing, and nailing a single crate of grapes?

Mr. Rutter: It depends entirely upon the variety of the grape. I can pack a carload of Mission grapes for one third of what I could the Muscat or Rose of Peru, and other varieties—Black Hamburg for instance.

Mr. Weinstock: If you had a chance of selling your grapes on the vine or selling them after they were packed, what difference would you make?

Mr. Rutter: Some varieties cost me from $7 to $10 a ton to get them in the crate.

Mr. Weinstock: That is a very important point, Mr. Chairman, the cost of picking and packing, and, if it is in order, I think it would be well for such gentlemen present who have experience on that question to give us the benefit of their experience. I should like to hear from Mr. Blowers on that point.

Mr. Blowers: It depends, as Mr. Rutter says, on the variety of grapes. My grapes average me from $10 to $12 a ton—the expense from the vine until I get them in the car, independent of the price of the crates or the baskets—just the work. I ship but very few Muscats; it requires a great amount of work to get them in the right shape. I should say it would cost from $12 to $14 to put them in the best possible condition.

FRUIT DRYING.

Mr. Williams: This season I sold my crop to the J. Lusk Canning Company, but of course there was a great deal of overripe fruit which I had to dry. I adopted a method of my own—peeling in weak lye. I gathered my peaches and brought them in under the shade of my umbrella trees, which my men think are very desirable packing houses by the way, and I made a solution of what my wife calls white lye, made out of ashes. I do not know the strength of it; just strong enough. It is lye that won't curl a feather, nor injure your hands in handling. I dip them in at the boiling point, about half a minute I suppose, and immediately after I dip them in the lye I plunge them in a cold bath, which cracks the skin and renders it very easy to take off. One man can peel two tons of peaches in a day, just as fast as he can take them out, throw them into cold water, and then I subject them to a sulphur bath, about ten minutes, in an ordinarily constructed bath.

A Delegate: What do you use to dip them?

Mr. Williams: I had a wire basket to hold about two dozen peaches—one of the hanging baskets I believe it was that I used in my nursery—containing about ten or fifteen pounds. I then put them in my drier and dried them from four to five days. I took samples of those peaches to San Francisco and submitted them to W. T. Coleman & Co. They offered me 20 cents. He says: "Those are very nice evaporated peaches; what is the size of your drier?" Well, I told him I had not measured it; it covered about two million acres down there. He says: "That is not possible, those are not sun-dried peaches." I told him he could come down and see. Mr. Bramhall was down to my place and didn't find anything but that big drier, and he finally gave me 22½ cents for those peaches. I think that method of peeling is far preferable to the ordinary peeling of peaches. I have not any patent on it, and do not know whether I ever will have.

Mr. Butler: What variety of peaches did you use?

Mr. Williams: I had various varieties—Crawford, early and late; George the Fourth, and anything I could not ship. They were overripe, except, perhaps, two or three tons. They telegraphed me not to ship any more, as it was in a hot spell. Those were in very fair condition. Most of them were ripe enough to eat on the table.

Mr. Butler: Would you dry those that were burst?

Mr. Williams: Those that were burst I dried without peeling. They were too soft to dip in the lye. They would absorb the lye. I only got 10 cents a pound for those.

Mr. Gray: I think the strength of the lye ought to be got at. How long did you run the lye through your leach?

Mr. Williams: We just took the ashes and boiled the lye about an hour; didn't use the leached ashes. That left too much color. It was a very weak lye; in fact, I believe that boiling water will almost do the work.

Mr. Block: I would like to ask Mr. Williams how the peaches were packed, and whether he can give the proportion of dried peaches to green?

Mr. Williams: My peaches were sold in white sacks of thirty-five or forty pounds. They were shipped to Chicago, and Colonel Bramhall told me they packed them there. They would run from six and a half to eight to the pound, owing to the variety of the peach. Some peaches have much larger pits than others.

Mr. Hatch: There are some houses that prefer to buy the finest of our peaches and apricots in sacks. They will pay just the same price as if they were ever so nicely packed, to save the freight. They will pack them there, and save money by it.

Mr. Butler: Were these selected peaches you sold?

Mr. Williams: My entire crop, without assorting.

Mr. Butler: Did it include many small peaches?

Mr. Williams: No, sir, we don't grow small peaches. Another matter that may be of benefit to the convention: I am very careful in pruning. In hand picking my peaches, I never leave any less than six inches apart on my trees. A great many of my neighbors think I am a crank, but I think I get as many as they do. I go over them once and pick off nearly all of them, and I go over them again. I dried my pitted prunes in nearly the same way. My apricots I sold green, I did not dry them.

Mr. Weinstock: Would the same process apply with equal force to apricots?

Mr. Williams: I do not think it is necessary to peel apricots in drying.

Mr. Wagenseller: Do you dip your prunes in anything after they are dried?

Mr. Williams: I dip them in lye, and just before I want to sell, I take them down in the heap and pour some boiling syrup over them. I also did my peaches that way.

A Delegate: How strong syrup?

Mr. Williams: I don't know. I made it sweet. I put twenty pounds of sugar to ten gallons of water. I poured the syrup over the peaches and allowed them to sweat. It brought out the dry ones and it made uniform the consistency of the peaches. I poured the syrup over them hot on a concrete floor I have. I have to use that as a sweating house, and put them on the floor in a heap. I did not mix my varieties. I dried all my Crawfords and kept them separate.

Mr. Hatch: I believe that the best prunes that ever were put up in California, or anywhere else, did not have any syrup on them, and they will sell for more money. They are neater, cleaner, and look brighter. It is necessary, undoubtedly, after you have gathered your prunes, to distribute them in piles, that they will have the consistency to save them from danger of action of worms, and afterwards to take them and put them through scalding water. Do this in the morning, put them out and take them up before evening again, to destroy the eggs of the insects, and excepting that, I think that any syrup is damaging, and I think that any man that deals in them will tell you so. As regards peaches, I have had no experience in syruping them; but in the matter of prunes, I believe I have had as good prices for prunes as anybody, and I vetoed that syrup business.

Mr. Gray: I did some prunes this year in twenty degree syrup, and sent them to New York. I will report later about the price. They looked very fine after being dipped in syrup, were not sugared, but had a gloss such as I never saw on any dipped in water.

Mr. Williams: To dip in water destroys the bloom that glosses prunes, that is detrimental to the sale. If you want to dip them, sprinkle them with syrup; it glosses them again. There is no crystallization at all, and I think it adds very much to their appearance.

Mr. Hatch: These prunes you can get at one of these fancy groceries, has neither the water nor the syrup. They are done without any dipping, they are simply pure. This syrup business collects the dust, and dirt, and everything. It is not nice, though it may shine a little for awhile.

A Delegate: It sells for 22 cents a pound.

Mr. Hatch: I sold prunes last year for 22 cents a pound, that did not have any syrup on them.

Mr. Blackwood: I have had some experience in prune curing. In the first place, I want my prunes thoroughly ripe. To do that I usually wait till a slight shake will drop them off of the tree. I then scald my prunes in lye previous to putting them out to dry. I dip them in the lye, boiling hot, long enough until the skin of the prune begins to wrinkle a little. I then give them a cold bath to take the lye off and put them in the sun to dry, and dry them down hard. I find that the better way. After they are thoroughly dried I bring them in, and when I get ready, I go to work to prepare them for marketing. I have varied my work a good deal from year to year. I don't know whether I have struck the right way yet; I think I have. I began with using cider in the place of grape juice. It put on a very nice gloss, although some one suggested that they use a syrup of sugar. Get some brown sugar, they said, and dissolve it in water, and scald the prunes in the sugar; that gives them a very nice gloss. I did that. It did give them an elegant gloss, and in two months the sugar crystallized on them, and I think Mr. Williams will find that that will be the case on his next spring. That discouraged me in the sugar business. I then commenced next year with scalding them with boiling water simply. I didn't spread them out, but I put them in a heap and kept them covered with cloths to keep the steam in. The next day they were nicely glossed, and in time I packed them and had no trouble. This year I adopted still a different plan. There is a disposition of the French prune to sugar if it is kept a good while under most any circumstances; it is a little like the raisin. The sugar that is in the prune will eventually find itself to the surface and give it a dull appearance. This year I used sea water for scalding my prunes, and I made an elegant prune. My buyers were pleased with them and paid me a high price, and I have heard no complaint. I do not know but they will sugar, but I think they will not. In regard to dried fruit generally, I believe in drying all fruit down hard, and if you dry in the sun it will probably be more or less stung with insects that in the end will produce worms—say in the winter or spring of the year. How to avoid that is a question with me. I concluded I would experiment a little as to what effect boiling water would have upon the dried fruit, and took a small quantity of dried plums and dipped them in boiling water and put them away in a bottle to see what would be the effect. The next day I examined my plums. They were softened down to a beautiful degree of consistency, not in the least wet; you could simply feel they were soft, and from that I concluded it killed the larvæ that the fruit might be stung with during the process of sun drying, and I went on and scalded all my plums, and the person I sold my plums to this year told me he never saw as handsome plums as those. He did not know how I did it. I did not tell him, but I do think the sun makes as good dried fruit as we can have. A good many make the mistake in putting plums two or three feet from the ground. Put your frames flat on the ground. There is a degree of moisture that will settle on the fruit one foot from the ground that will not settle upon it if upon the ground, for the ground having absorbed the heat of the sun during the day retains that heat to such a degree as to keep the temperature at the ground above the dew point. I have found that fruit rotted two feet from the ground when those right alongside on the ground dried beautifully.

Mr. Wagenseller: I am interested in the drying of plums, and dried over ten tons this year. I laid down two by four on the ground, and then I used surfaced lumber, making a tight floor some forty-five feet square. I had a small pitting machine, and a lady could pit from five hundred to six hundred or seven hundred a day, according to the size of the plum.

During part of the time the sun was from one hundred degrees to one hundred and four degrees in the shade, and after twenty-four to thirty-six hours, as the case may be, I had a square-pointed shovel, and I went in and turned them over, and that loosened those that were on the floor, kept them from fermenting; and I would turn them that way about every day, according as they would dry. And when they were about two thirds dry, the sun at the same time being very warm, I watched them closely myself, removed them to a very large floor close by that I had covered with canvas, and there I placed them thicker, from two to four inches. I would thicken them up, and that air dried them, consequently I had no sunburned plums, and they dried eventually. After they dried sufficiently, as I thought, I binned them up, keeping each variety by itself, and I kept them there until I was ready to sack them, and then sacked them up in burlaps, common new grain sacks, and hauled them to Cloverdale, thirty miles; and I left them there until I had a carload, or a little over, and then sent them to San Francisco. After I went to San Francisco and sold them to George W. Meade & Co. for 6½ cents; that was about five weeks ago. That was my process, and I came and asked Mr. Meade this question: "Mr. Meade, suppose that I had put those plums through the processes that they talk about, dipping them and put them in boxes, how much more would I have got for them?" His reply was this: "We can do that much cheaper than you can." That is my experience, although this platform that I had was not sufficient. I used, also, quite a large number of trays, and went to a great deal of expense to get surfaced lumber from the mills. I used trays about three by six, so that I picked them up and lifted them anywheres, and I would loosen those trays in the same way, with a plasterer's trowel; they dried that way very well. I am satisfied that I can improve a little in another year, but there is one point, when the sun is very hot you have got to watch the fruit, that you do not get it too crispy.

Mr. Blackwood: There is one thing Mr. Meade will have to do, if he would have the plums free from insects—he will have to scald them himself.

Mr. Wagenseller: I think Mr. Meade informed me he would put them through the process.

Mr. Gray: I would like to ask if steam would not be better than hot water? I have had some experience, and always have had very good success. I think it is a quicker job than dipping with hot water. You can steam a large quantity at once in the trays, and do it very fast. I think it would kill all the insects, even in Chico, where it gets to be one hundred and ten and one hundred and fifteen. I never dare to mix them up as Mr. Wagenseller has done. I always thought it would make a very mushy and poor article. I should not dare, also, to put them in grain sacks. They will be fuzzy, in spite of anything.

Mr. Wagenseller: The reason I put them in grain sacks is, four or five years ago I put them in cotton sacks, and shipped to J. M. Hixson, San Francisco; and the sacks got torn, and Hixson told me to put them in new grain sacks. Two years ago I did so, and my plums brought within half a cent of the highest price for pitted plums; and I knew I had no plums that were first class, either.

Mr. Hatch: A suggestion was made to me, as to preserving dried fruits, by a gentleman who has tried it for a number of years—to dip any kind of fruit, which he wishes to keep any length of time, in hot water, with a little sal-soda in it. It is reasonable to think there is some property in it that would have desirable effects. With him, he says, it is no experiment. He has kept fruit free from worms for two years. I have heard that Mr.

Milco used sal-soda for the fig; and if it is good for the fig it may be good for other fruits.

Mr. Block: It may soften the water, and that may be the advantage.

Mr. Gray: In dipping prunes it was suggested to put in a little glycerine. I never tried it, as I did not think it was a good plan; but it was suggested by one of the principal buyers.

Mr. Blowers: I have been waiting to hear about glycerine. Glycerine is something that has a strong affinity for water; it is not changed by the atmosphere at all. The Sultana raisin is prepared in Europe by being dipped in a solution of potash and sweet oil, and American taste is not adapted to sweet oil, and after a series of months it becomes rancid by the oxidizing qualities of the atmosphere; but you can use a preparation of glycerine, say a pound and a half to fifteen gallons of water; it has absolutely no taste, except a sweet taste, and is not changed at all by the influences of the atmosphere and will always remain soft, and by using that it will prevent the oxidization of sugar on your prunes, and give them that bright appearance which is desirable. I have not used it on them, but I have used it on several thousand boxes of seedless Sultanas. They are very good, and remained very nice and soft during the year.

Mr. Olsen, of Courtland: You want to destroy the insects on your dried fruit.. You take and put one quarter of a pound of sal-soda to a gallon of water, apply it hot, and you can keep the insect away from there and the fruit will be as nice in one year as at the time you put it down.

Mr. F. W. Buck: I put up a drier of about four tons capacity of green fruit on Mr. Blowers' patent; it has been not quite as much of a success as I anticipated, from the fact that I needed an exhaust fan on it. I undertook, with the assistance of Mr. Blowers, to try to run this drier with the natural current, but it was not quite sufficient. I have had very good success with it, however, but I did not get quite the capacity that I expected. You all know the drier, probably better than I do. Mr. Blowers has had it operating with great success in making raisins, and to use it simply as I do, to dry the refuse part of the crop, I think it is probably the best that a man can put up. If I had it entirely completed, as I expect to have another season, I would be better prepared to give you the workings of it. Mr. Blowers can probably give a better explanation of it than I can.

Mr. Hatch: I want you to state how you made the refuse of the crop profitable through the use of the drier.

Mr. F. W. Buck: I had, probably, one of the largest peach crops there was in the State—something over two hundred tons. I sold off the number one peaches, all that would measure two inches and a quarter or so in diameter, to the J. Lusk Packing Company; of the balance, of course, the culled part was something like one sixth or one seventh of the crop, that was imperfect fruit over ripe, and some not quite ripe enough; windfalls, perhaps some wormy, and some too small. That fruit was sorted out as the fruit was taken out to be shipped to the cannery; and of this I made three grades of culls. The first grade I peeled, not as Mr. Williams did, but with a little hand machine, and that was probably one third of the culled part of the crop that I peeled. The other two thirds I put in with the peeling on. This fruit I sulphured a moderate time, not by having the direct fumes of the vapor come on the fruit, but by burning the sulphur in little sheet iron drums, and conveying the fumes of this drum to the largest sulphur box, which contained about fifty trays at a time. By that means I got the fruit very well bleached out without tainting them, which it does by having the sulphur burned directly on the fruit. This fruit was taken from there to the drier, and it took probably on an average, about eight hours to dry the peeled peaches, and ten to twelve hours to dry the unpeeled. I made as careful an estimate as I could, after I had run the drier a couple of weeks, and at the price I sold the peeled peaches, in twenty-five pound boxes, at 20 cents a pound on board the cars, I figured that the peeled peaches netted me 3 cents over and above all expenses. I did not figure that on the Crawford peaches taking the season right through. On the Crawfords, and Susquehannas, Salways, all yellow free stone peaches—I dry very few, if any, clings—I figured that I got from five pounds to five and three quarters, to one pound of dry fruit. Five and three quarters on the early Crawford, and five on the late Crawford. The other peaches I sold at 13½ cents, the unpeeled, taking them at the same rate, net me 2 cents for the culls, the very refuse of the culls. So on the whole, the thing was very satisfactory to me, and I intend to double the capacity of the drier that I have, by putting on the exhaust fan with a little four-horse power engine to run it, and I expect to be able to handle thirteen tons of green fruit every twenty-four hours next summer. I expect then to be perfectly independent of the fruit canners, and if I cannot get a reasonably fair price for my fruit, I am going to dry it. I bought for experimental work, two tons of French prunes—they were not all French prunes either. I had probably eight or nine hundred pounds in the lot of what you call the Fellenberg. I bought them for 1 cent on the tree, and gathered them myself. I weighed the prunes carefully when they were put in the drier, and weighed them when they came out, and I got out of those prunes for every two and seven eighths pounds of green fruit, one pound of dried. I sold them to a local dealer, right in my own town, at 7 cents spot, in twenty-five pound boxes. There was not enough that I cared to speculate with them very much, or to hold for a better price, because they netted me from the price I paid, from 50 to 75 per cent profit, and as long as I was experimenting, I was satisfied with it.

A Delegate: What was the cost of the drier?

Mr. Buck: The cost of the drier I could not state, because Mr. Blattner has the drier patented. The building cost me, as I have it now, with the capacity of four tons of green fruit, $850, with the brickwork, furnaces, and the building, without the trays. I use a tray made of half-inch slats, nailed together and spaced about one eighth of an inch apart. The trunk of the drier in one end is the brick furnace, or the hot air chamber, which contains the sheet iron drums, or fire-box, and from this, then, is a system of drums running back and forth through the hot air chamber, which thoroughly heats the air, and the cold air current comes in at one side of the furnace; it is deflected by the heat drums to the top of this air chamber; from there it comes back nearly to the ground, and passes out into the drying rooms. There are five rooms running parallel and alongside of each other; each one is separate from the other, and each of those rooms holds about one hundred and twenty trays. The current comes in at the bottom, and right there where the hot air comes out, we have a row of solid trays, which carry the heat from the back right through to the front. Then each layer above that is the slotted trays, with occasionally two or three more rows of solid trays towards the top, that carry the current back and forth; then the first row of trays above the solid row in the bottom, goes clear back against the wall, and leaves a space of about six or eight inches next the doors which allows the current to go up one row of trays; it strikes over the next row of trays, coming clear out to the door, which carries it back, which gives it motion like that back and forth, clear across the room, and about one third of the way up from the bottom we let in a smaller current of air up from the furnace. As I say, it works very satisfactorily, but takes a little longer time than we anticipated it would, from the fact that the natural current does not carry the moisture off quite fast enough. I expect, though, with the exhaust fan, which I am going to put in, to have a complete drier, and will be glad to show it to any one who would like to see it, at any time, and explain it to them, as well as I can. Mr. Blowers is very sanguine of its success on peaches and apricots, and from my experience, I am too.

Here a recess was taken until two o'clock.

AFTERNOON SESSION.

Vice-President Butler, in the chair, announced the topic for discussion: "How the Fruit Growers are to Dispose of their Fruits without Coming into Competition with each other as to Prices for the same Quality and Kinds of Fruits."

Mr. Weinstock offered a series of resolutions, of which the following were adopted, after discussion:

Whereas, This season's experience has demonstrated that the following serious evils exist in our methods of marketing green fruits in the East: First, the provision exacted by transportation companies, that fifteen carloads of fruit must be shipped at a time to obtain a $300 rate from California to Chicago; second, the excessive freight rate from Chicago to such eastern points as New York, Philadelphia, or Boston; third, the precarious and uncertain time on which fruit trains are run between here and the East, frequently causing delays of from twelve to thirty-six hours, and thus seriously depreciating the value of the fruit before arriving at its destination; fourth, the lack of a sufficient number of cars adapted to the fruit-carrying trade; fifth, the lack of regulated distribution, the want of which has, during the past season, caused as many as twenty or more carloads of perishable fruit to reach the City of Chicago within twenty-four hours, many of these carloads becoming rotted and worthless before they could be sold, while, on the other hand, cities like Brooklyn, Baltimore, and Washington, have received only from fifty to seventy-five crates from the middle of August to the end of September, and cities like Boston and Philadelphia have received only from a quarter to half a carload each per week, and the City of New York, with its population of nearly one million five hundred thousand, has, during the same period, received not over a carload a week; sixth, the need of proper inspection at this end of the line, vast quantities of inferior and imperfectly packed fruit having been permitted to go East, thus not alone causing its owners serious losses, but also greatly depressing the price of such good California fruits as happen at such times to be in the same market; seventh, the need of a speedier method for the disposal of our fruits on arrival at their points of destination, the present method being such that perishable fruits often remain in the hands of eastern agents an entire week before being closed out; and, lastly, the need of a system whereby our fruits will be thoroughly distributed, and placed in the hands of the largest possible number of eastern retail dealers, so that the competition among retailers may reduce the fancy prices they now demand in many cities, and so that our fruits may be as completely popularized, and placed within the reach of the millions, in all the cities of the Union, as they this year have been in the City of Chicago, where they were retailed at 10 cents a pound, and where the consumption was increased in one year from an average of three carloads to an average of eighteen carloads per week. And, whereas, we know of no good reason why the California grape grower, whose products are universally pronounced among the finest in the world, should be obliged to accept for his magnificent fruits much less than half the returns realized by Mediterranean growers for inferior fruits, sent here by them, and sold in our own country, and in a territory that rightfully belongs to us; and, whereas, we fully realize that unless the evils herein set forth are promptly remedied, fruit growing and shipping must, as a rule, prove as unprofitable in the future as it has during the past two seasons; and, whereas, we fully realize the very great influence the success or failure of fruit culture must have on the future of our State; be it, therefore,

Resolved, That the fruit growers of California, assembled in State Convention, do hereby call the attention of the California railroad authorities to the present serious condition of affairs in the fruit industry, and express the hope that the action of this convention may awaken a deeper interest on their part in the crisis at hand. It is to be trusted that they realize as fully as we do that fruit growing, so far as it lies in the power of transportation companies, should be made a profitable industry. It is useless to look for much desirable immigration so long as fruit culture, which has now become one of our chief industries, does not, with the closest attention, yield a living. Fruit carrying should be looked upon by California transportation companies as nails are regarded by the hardware merchant, calico by the dry goods trade, and flour and sugar by the grocer. In other words, fruit should be treated by the railroads of this coast, not as a fancy article, to be made to bear a fancy tariff, but as a leading staple, worthy to be transported at the least possible cost.

Resolved, That a committee of ten growers and shippers be appointed by this convention to lay a copy of these resolutions before the railroad authorities, and ask: First, that the present restrictions be so modified that ten carloads or less shall constitute a $300-rate fruit train; that the rate upon cars by passenger trains be $400 per car, and that the slow freight rate be $200 per car. Second, that the rate to such eastern points as New York, Philadelphia, and Boston, be made not to exceed $400 per car. Third, that passenger time be guaranteed; and, fourth, that a sufficient number of cars suitable for the fruit-carrying trade be provided.

After discussion on the other resolutions, it was ordered that a committee of nine—three from the California Fruit Growers' Union, three from the California Fruit Union, and three who are in the business of shipping fruits to the East—be appointed as a committee of conference, to submit to this convention some plan of action in this matter, and that this committee report to the convention to-morrow evening.

Adjourned until half-past seven o'clock P. M.

EVENING SESSION.

The Chairman announced that the topics of discussion this evening were: "The time to Prune;" also, "The Gooseberry."

Mr. R. C. Kells, of Yuba City, read the following essay on "Planting and Pruning of an Orchard:"

[Here Assistant Secretary A. T. Perkins, being unavoidably called away, and Secretary Webb being too ill to perform the duties of Secretary, Mr. E. J. Wickson kindly offered to perform those duties, which offer was accepted.]

Mr. President, Ladies, and Gentlemen of the Convention: At the Fifth Annual Convention of the California Fruit Growers, held at Los Angeles in November, 1885, it was resolved that the late Dr. S. R. Chandler prepare an essay, to be read at this convention, upon "The Planting and Pruning of Deciduous Fruit Trees."

Since the adjournment of the Los Angeles convention Dr. Chandler has passed from earth full of years and honor. By his death the State has lost a useful citizen, and the fruit growers of the northern portion of the State are bereft of one of the most progressive and enterprising pioneers.

I fear that my limited experience in growing fruit will make me a poor substitute for the full and mature knowledge possessed by the late Dr. Chandler; but having been called upon to respond in his stead, I will endeavor to do so to the best of my ability. It seems to me, Mr. President, that the subject I am expected to treat is a very comprehensive one. "The Planting and Pruning of Deciduous Fruit Trees" seem to embrace a very large portion of the duties of the orchardist. Believing it to be a beautiful maxim, that "whatever is worth doing is worth doing well," I would, in planting, use great care that the soil and climate should be thoroughly adapted to the tree I propose to plant, the land should have underdrainage and the soil should be deep, avoiding stiff, clay soil as much as possible. I fully believe that a deep, thorough, summer fallow plowing, "not less than ten or twelve inches," beforehand will, without doubt, repay the planter. Of course, the planting should be thorough. A hole less than two feet in diameter, and deep enough to set the trees as when in the nursery, being careful that every root has room to point outward and downward. In my opinion early planting is a very important matter to take into consideration—say from the middle of December to the middle of January. By so planting your ground becomes firmly settled around the tree, and as the warm spring sun warms the earth the tree is ready for a luxuriant growth; whereas, late planting is often injurious, both to the tree and planter. I would, for my planting, if I could not plant early, rather have my ground lay in deep summer fallow, preparatory for early planting the next season, than to take the chances of late planting. Some men say: "I can't get my ground ready until late." *Don't plant* at *all*, if your ground is not ready early and in good order.

I have always maintained the opinion that, as a rule, the fruit growers of California plant their stone fruit trees too close together. Of course, the value of the soil is an important factor in this branch of the question, but in no event, in my judgment, should the peach or apricot be planted less than twenty-four feet apart, nor the apple or pear twenty-eight to thirty feet. The plum family would probably succeed well if planted twenty to twenty-two feet apart; the cherry, also, although a close and tall grower, should be planted twenty-four feet apart. It is a commonly accepted theory that the roots of a tree correspond in dimensions with the top. Such being the case, and I am disposed to believe it, an apricot orchard on good, strong land, six years old, would present a case of the entire soil being packed with a dense mass of roots. I have frequently seen (and I presume every fruit grower in this convention has also) apricot orchards planted twenty-four feet apart, that had been vigorously pruned when young, through which a man could scarcely ride on horseback. Another, and I think a more cogent reason, in favor of wide planting, is the better facilities it affords the ripening fruit of getting plenty of sun and air. One box of rich, luscious peaches or apricots with a golden cheek is worth more in the market, and *ten times* more to the palate, than two boxes of sickly, greenish fruit that never felt the genial rays of a summer sun. I well recollect having heard it said of a very enterprising fruit grower in my section that he cleared more money in a given year off of the south side of the south row of his apricot orchard than he did off of the two entire rows immediately adjoining on the north. The orchard in question was planted twenty feet apart, was about eight years old, on strong land adjacent to the Feather River, and was as dense as a forest, the branches in *some* of the trees lapping two and three feet. It must also be borne in mind that the usual longevity of the pear and cherry is half a century, and that after the tenth year they attain an enormous size. Experience has taught the old fruit grower in our older sister States that planting the pear and cherry thirty, or even thirty-five, feet apart is better than twenty or twenty-five feet apart.

After planting, the orchard should be thoroughly cultivated, no grass nor weeds should be allowed to grow in it, and during the first two years of its existence the ground should be kept stirred during the early spring months, so that when cultivating is discontinued in May or June, your orchard will look like a garden. I am of the opinion, also, that no crop should be grown in a fruit orchard, and especially after the first year. Where the ground is very strong, the detriment may not be clearly apparent, but the inevitable tendency is to retard the growth of the tree.

Among the very numerous implements offered by the trade for pulverizing the orchard, my inclination is to give an important place to a board rubber, about six feet wide and made of lumber two inches thick and eight inches wide, lapped like the old style of weather-boarding, and which can easily be made in a couple of hours by any ordinary farm hand. The only objection I hear against "rubbing" orchard ground, is, that a heavy rain following the rubbing, would be liable to pack the ground too much.

Such is never the result in a sandy soil, and to no injurious extent in any soil suitable to the planting of deciduous fruit trees. The rubber above mentioned can be drawn by two small horses with great ease, with the driver riding upon it.

The mode of pruning deciduous fruit trees is as various as the mutations of the human mind. Of course, soil controls pruning to a limited extent, and climate to a very great extent. In my section of the State, where the thermometer reaches one hundred degrees nearly every summer, we are, in a measure, forced to one system of pruning young trees, to prevent the burning of the trunk by the sun. When we plant, we cut back to ten or twelve inches, and when the tree exhibits plenty of good, healthy buds lower down, we cut as low as seven and eight inches at the first opening succeeding the planting. We cut all the new growth back to seven or eight inches, and aim to leave four branches well distributed around the tree, giving it symmetry and strength. We never leave more than five limbs or branches.

By this mode of pruning it will be perceived that the trunk of the tree can't be but a few inches in height. When two limbs come from one point or same bud, *one* should *invariably* be cut off. A tree should never be allowed to *fork*, and each limb should leave the trunk at a distinct and separate point. By using the utmost caution and judgment in cutting back at the pruning time, one year from transplanting, it is believed that the tree will have symmetry, strength, and vigor, and all danger from blowing down, twisting off, and breaking during storms will be avoided. Another very important feature favorable to low pruning or cutting back in which every fruit grower must feel deeply interested, is the expense of gathering his fruit. I have contended that we can gather our fruit for one half the expense by picking off of our low pruned trees than to pick from high trees the old way with the twenty-foot stepladder. I noticed an article a few days ago written by one of the largest peach growers in the New England States, saying he could gather his fruit for one fourth the cost off of his low pruned trees as that of his high trees. Hence, low pruning for convenience, economy, and wealth. I have no doubt but that where one orchard is too severely pruned, nine are neglected in that very important respect. A vigorous young tree on strong ground, at the pruning time, two years after transplanting, provided it has been cut back with the severity above mentioned when one year old, will throw out an average of ten limbs of about equal size. It is ruinous to leave more than five of them, and four would be preferable. Let them be well distributed around the trunk, and invariably cut out the center and leave the outer limbs, cutting them back to twenty inches, or thereabouts. By thus spreading the tree the sun will reach all the fruit it bears. Subsequent pruning should vary according to circumstances. On strong, wet land, where the new growth is very large and brittle, the cutting back should be much more severe than on high, dry land, where the young wood matures with its growth to a greater degree. I also believe that summer pruning is an advantage to a young orchard where the trees put out such an enormous growth as most of the well *cultivated* and well *pruned* orchards do.

DISCUSSION.

Mr. Wagenseller: I would ask some gentleman how to prune the French prune tree.

Mr. Routier: I have had ten or twelve years experience with the French prune. First, I trimmed them back every year, and I soon found out that was wrong. Now when I plant a tree, I trim it to about two feet from the ground the first year; the second year, like the gentleman who wrote this essay, I leave about four limbs between two and three feet long. Then the year after if they do not make a big growth, I do not trim at all, because the more you prune the French prune, the more wood it will grow, and the more fruit it will give. I noticed last year when I trimmed the French prune trees very early, they grew very finely all summer, and the result was that the green aphis has been very flourishing on the tree at the expense of the plum. My idea is that when the French prune tree is about four years old, it does not require any pruning at all in the way of shortening the limbs; all it requires is thinning out inside when the tree gets too thick. In doing this you get your tree spread very nicely, the fruit will be exposed to the sun, they get a good color, they will all dry to perfection, and I notice if you trim them too short it is against you all the time.

MR. STABLER: If you were planting a French prune orchard now, after twelve years experience, how far would you plant them apart?

MR. ROUTIER: If they were on peach root, I would plant them twenty-four feet; if they were on plum root, twenty-one feet.

MR. SHINN: One remark in reference to pruning a tree, and that is in reference to the height it is to be cut back the first year, supposing it to be a one-year old tree, they will start below the point where they are cut. I should be afraid, sometimes, in cutting back to six inches, that they would be a failure, for the buds below that point would be so nearly dormant that they would not start, or if they did not, until the roots had suffered for want of foliage. If the trees grow very close in the nursery, they will run up to be slender, and if they are cut back very short, the probability is they will not start. Let every man cut back to any point that suits his climate or his judgment, but be sure there are five buds that will develop below that point.

MR. BLOCK: I would ask Mr. Shinn if he would make any difference between the French prune and a plum, or a German prune; whether he would apply the same method?

MR. SHINN: I should think so; the plums and prunes all belong so nearly to the same family that there won't be any difference, but there may be. I know that some of your Santa Clara orchards are very low, almost like gooseberry bushes.

MR. GRAY: I believe in low pruning, but with Mr. Shinn, I do not believe any tree ought to be cut back to six or eight inches. I believe you can get a tree just as low as you need, yet I do like to see a little, small piece of the butt at the ground, so that the crotch of the tree won't be right down in the dirt; for I have noticed the last year or two that a great many of these trees that branch out near the ground become very weak. The dirt, and dust, and rain penetrating the division between the limb and the body will weaken it, and then be more likely to break than if they were a little up from the dirt. As to the danger of the trees burning, there is very little danger, if, for the first three years, you protect them well with the natural buds that start lower down, not cutting them too close until the top of the tree is large enough to shade the ground.

MR. ROUTIER: Mr. Chairman, I want to qualify my remarks. If you plant trees in rich, bottom land, you can leave the trunk four feet if you want to. If you plant the same tree in the upland, what we call timber land, it is better to cut it to eighteen inches or two feet. If you cut to two feet, at least one foot of that will be covered with shoots trying to grow, and that would leave only a trunk one foot high, and by throwing your furrow against it there would be six inches left, and I think that is enough for anybody.

Mr. Wilcox: I differ somewhat from the views that have been expressed by most of the speakers. From my own experience I find you cannot adopt one system for all soils, even in one county, Santa Clara, for instance; there we have hundreds of acres of this fruit, perhaps the largest orchards in America. In the dry lands, towards the hills, they prune higher. I put out some prune trees among my strawberries, and I thought I would prune them up high, so as to get them out of the way of the strawberries, and cut them down about breast high, and after they had grown a year they put out suckers half way down to the ground, and the next year I found the main body had dwindled down to not much larger than when I had planted it; so I took the shears and cut out the stump and let the branches form the main part of the tree. About pruning prunes and plums. I find the prunes grow more upright, and I would make a great distinction in pruning them, for I find some varieties of plums run out their branches sideways. So far as pruning prunes is concerned, I find that the fruit buds are now set on last year's growth of wood. This year's growth will not bear this year. When I prune, if my tree grows too straight, I cut so that the buds run out and give it a good shape. In that way I will have an open head to my tree without taking out very little of the center. I can prune with my thumb and fingers in the summer. The better way is that way. I find after three or four years they need very little pruning. They bear on the ends, and if you should take off the ends of your limbs you would spoil your tree. The location, however, makes a vast difference as to how you should treat your trees. Mr. Block has the oldest orchard in our county. His trees are sixteen feet apart and the tops run together, forming an arbor, nearly; yet it is astonishing how much fruit you will have on them. My son says he plants his eighteen feet apart, and says he would not have them any more.

Mr. Wagenseller: This is a very interesting subject to me, for I have had a sad experience. Some eleven years ago, I planted some five or six hundred plum trees, with a few prunes among them, and my nurseryman told me to cut them off low; and I went along after they were planted and cut them off about there [showing]; just slipped them off promiscuously. I found after a year or two, that I did right with some varieties. The peach plum, for instance, is an upright, but, as I had some Columbias, and as that is just as likely to grow downward or upward, I want to know if you cut them, what kind of a tree you will have—I know what kind I have—therefore, when a person asks me how to prune, I tell them it is according to the habits of the tree. If you have a tree that is likely to grow straight out, you don't want to cut within two feet of the ground—cut higher.

I would treat the Bellflower apple that is spreading, the same way, and the White Winter Pearmain, while the Yellow Newtown Pippin I would cut right down within eighteen inches of the ground, because it grows right up and spreads as it grows up. I think the only rule is to use judgment in pruning; watch the habits of the tree and see how it grows.

Mr. Husmann: It is my experience, also, that no fixed rule can be given. That a man must use his own judgment, and be governed by the variety he has to deal with; besides, I believe more than I mentioned yesterday, in forming young trees by thumb and finger, pruning them by the knife—probably we need them both. We can save a great deal of knife practice if we practiced more with the finger and thumb during the summer.

Mr. Klee: I agree with the view expressed, that trees should be pruned according to their variety and habit. It is impossible to lay down a fixed rule. It is something that we gradually have to grow to; it cannot be learned in six months or a year. I believe that all over this State a moderate height of the trunk is far better than the high trimming, which, by the way, is being adopted in a good part of the southern portion of the State in new orchards. I think, perhaps, in the hottest part of the State, the very low training may be the best, but then at the coast it is far better to have a moderate stem, two or two and a half feet high, than much higher. I have tried it in my own orchard, and I see a world of difference between trees with high and low trunks. The tree will grow twice as much when it is trained about two feet and a half than when it is trained five, as has been adopted along the coast, and used to be the general rule of pruning. There is one point about pruning that most people that are used to pruning know, but a good many novices do not pay any attention to. It is this, that you may, by proper pruning, convert the whole tree into bearing wood; I mean that by pruning, cutting back limbs, you may force out every bud of the tree. If you prune too long you will find a number of buds at the base of the branch that will not come out, the growths will be in the ends. Those buds will remain dormant, and especially in the case of apricots I have noticed, and apples, too, you may sometimes have three or four feet of a long branch which has no side branches and will not produce any fruit spurs. If that is the case, how does your low pruning help you? If the fruit is brought up three or four feet at the end, you have no advantage in your low pruning. When I prune, say an apple, I prune short enough to force out all the buds. The end ones will make the growth for the next season; the ones from the base up to the end will form the fruit spurs. Hence you will get your fruit spurs all over the lower part of the limbs, and the fruit will be easy to pick, and the limbs will not break down with the weight of the fruit. Now, Mr. Wagenseller was speaking about the Bellflowers. Although I have never trained it as low as was intimated should be done, I have trained Bellflowers in a way to force it into the shape referred to. It is a law of vegetable growth that instead of the tree getting the habit of spreading out when it is pruned comparatively low, it grows almost upright, at least so to a great extent. By observing and cutting by the right buds, you may avoid also the manner of spreading by taking the inside bud; you can get the branch to grow exactly the way you want it. Of course if you cut on the outside buds you will continue to throw the tree out; if you cut with the bud extending on the side the growth will be upright. That is the way I do when I come to a tree that has an awkward growth. We have in the position of the buds just a guide how to place the branches as we want them the next year. Another point I want to bring out is necessary to consider if you want to have the whole lower part of the tree converted into bearing buds. I cut back to a sufficient length; that length will vary according to the varieties, just how much we cannot tell, without we know the habit of the tree, and there is the greatest difficulty. The tendency may be different in different soils, according to the way they grow. I think, as a general rule, that for young trees, for the first growth, about two thirds of the branch, and the later years about half that will hold good in many cases, but it has to be adjusted according to the manner of the growth of the tree. Summer pruning is an excellent mode of pruning. What we can cut off with our thumbs will save a great deal of work in the winter time. If you have persons of judgment in your orchard that is the way to do, but you are aware that you can do more harm, also, if you have persons that do not know how to prune; they tell better when the growth has been made. You can understand better how to prune in the fall, when the branches are out, than you can in the summer. It takes a person of a little imagination to see exactly which ought to go out, but I believe firmly in summer pruning. It is a great advantage to an intelligent orchardist, and, by the way, for forcing branches into fruit bearing, it is my method, and I try to follow it as much as possible. With reference to the Bellflower apple, it has a tendency to bear at the end of the branches. I was told that it was an impossibility to bring the Bellflower into the system that I prefer, to have fruit bearing wood along the main branches, but if you do summer pruning and force out the buds, and keep cutting them back, you can gradually have the whole tree just as well as any other kind of apple.

Mr. Williamson: My judgment is, that in a fruit orchard it requires a great deal of judgment to know how to prune in the summer, or just when to prune. Mr. Klee has advanced the idea that if you pinch back in the summer, you will force out fruit buds. If you pinch back anyways early in the summer, you are more likely to throw out wood buds and wood sprouts, than you are fruit buds. I saw a gentleman a year ago last summer that headed back a lot of small peach trees two years old. I guess it was in August he headed them back. I says, "What is your object?" He says, "I wanted to force out fruit buds, but I notice wherever I have cut out a branch I have got three or four more shoots come out." Instead of forcing out fruit buds he has forced out a lot of other buds, and had a lot of little branches, when the frost came, about two and a half to six inches long. The frost cut them. My judgment is that summer pruning, with the view of forcing out buds, had better be called fall pruning.

Mr. Husmann: In reply to what Mr. Williamson says, I know there is a great deal of judgment required in summer pruning. But is there not also a great deal of judgment required to prune at any time. If a man has no judgment he will spoil the tree, whether summer or winter. No man who knows anything about summer pruning, will prune in August; that ought to be done in June or early in July and not in August.

Mr. Klee: I want to qualify my remarks about summer pruning. I had not in my mind the peach tree at all. I had reference to the apple, pear, and plum especially, where, by cutting short, I had forced out switches, which, if they were not pinched, would become strong branches, but if pinched would become fruit-bearing wood. As regards the peach, it wants an entirely different system of pruning which we all know; its fruit buds being the last year's growth, we have fruit buds all over the tree. With the pear and apple it is different; therefore we can't lay down a system that will hold good for these and for the peach, too.

Mr. Blackwood: The great trouble with all orchards in California, generally, is overbearing; and I cannot see the advantage of summer pruning to bring out fruit buds. We have altogether too much fruit on our trees. I spend hundreds of dollars every year to thin out my fruit. There is only one sort of summer pruning that I am in favor of; that is the pruning of the cherry, and I wouldn't do that until after the fruit is gathered. The object of pruning the cherry in the summer season is that, as compared with the winter pruning, it very seldom throws out any gum, where the cherry is pruned after the fruit is gathered, but immediately proceeds to heal over. I have listened to the various remarks here with a good deal of care and attention. There are two things to be considered in pruning. One is the form of your tree, and the other is to secure its vitality. In the region where I live there is a good deal of what is termed pruning in done; heading in; cutting off nearly all the wood in winter that the tree makes the preceding summer. I have watched it for a number of years. I have questioned its propriety, until now experience has convinced me that it is short pruning in of the tree from year to year that tends to shorten its life. There are trees in my neighborhood that have been pruned in that way for six or eight years steadily, that now begin to show signs of decay, while those that have been allowed to grow a little more natural, taking out occasionally a spare limb here and there, show no signs of decay whatever. I agree with Senator Routier, that after a tree has got its shape, its form, its size, there is very little pruning needed, other than to keep it cleaned out. When the tree comes into bearing it naturally ceases to make wood very rapidly; but the strength of the tree goes to make fruit; hence there is very little need of shortening in after the tree is in bearing. In regard to starting a young tree high or low, my own opinion is that the tree should be started not more than eighteen inches, or at most two feet from the ground, so as to get a clean stalk a foot or so from the ground. It enables the cultivator to keep his trees clean at much less expense than he would do if the branches came out on the ground; and, at the same time, when the top is formed there is all the shade that is necessary to protect the trunk of the tree from burning.

THE GOOSEBERRY.

Mr. Wagenseller: I have a number of gooseberry bushes, of the English variety. Two or three years ago a worm commenced to trouble me; and the question now is to save my berry, after I have the bushes raised. It is a small worm that comes about the time that the berry comes into bloom. It is about a quarter of an inch to an inch long; and when the berry is the size of a grain of wheat, they puncture the berry skin. It drops then. They keep coming until the berry is two thirds grown. The worm is what I would call a striped dark green, and light green, and a few of them are light and dark brown. They have destroyed the entire crop on some of my bushes; and then there will be apparently two or three bushes along they will not touch at all. I sent some of them to Mr. Wickson, and he seemed at a loss to know from whence they came, as well as myself. If I do not find any remedy I will have to dig my bushes up in a year or two more. I wish to know whether any gentleman here has had any experience with anything of the kind.

Mr. Block: I would ask the gentleman whether they remained on the bushes all the time, or whether they leave them.

Mr. Wagenseller: That is what we have been trying to find out. I think they go down, because after the berry is two thirds grown they disappear entirely; they eat a hole into the berry. You never can find them in it, unless when they are feeding. I don't know whether it turns into a moth or not. Mr. Wickson recommended me to cover a bush with a mosquito net, so as to find out what became of the worm.

Mr. Wilcox: I should judge your pest is a new one to this coast. I planted out fourteen acres of gooseberries a number of years ago—the largest quantity I ever knew any person to have—and I studied up this berry very thoroughly. The gooseberry is cultivated to the greatest extent in England, on the north slopes, where it is very foggy, and yet when we come here those very varieties will mildew anywhere near our coast. In all my investigations about the gooseberry I do not recollect anything like the pest discovered here. I would advise cutting off of those plants near the ground, put lime near the bottom, and you will rid yourself of most of them; or put in plenty of chickens and turkeys and you will rid yourself of most of them.

MR. WAGENSELLER: The berry I propagate mostly is the *White Smith*, an English berry. That is the main one, although I have several. I have a berry, brought from Scotland a few years ago. It has a very thick skin, and ripens about two weeks later. They didn't seem to bother it this year; and I have a few bushes of the Hawton Seedling, such as you have around the bay, right alongside of them. The worm has no use for them, and did not touch them at all. I guess they were too small, or something. It was either that or else they bloomed a little later. I had an abundance of them, but I had no use for them. I did not gather them.

MR. BLOCK: I would suggest a remedy for the gentleman to make a trial with, and possibly he might meet with some success, such as I did in the experiment a number of years ago. I read in the "Gardener's Monthly" a suggestion to treat certain insects—white hellebore, which is poison, by the way. I used a handful, steeped as tea, strained into a bucketful of water. I have used it for the saw fly. I sprinkled the trees with it, and found it very effectual. For the purpose of ascertaining how strong it would be required, I have taken the residue of what was left of the plant itself, and steeped it again in a bucket of water—about three gallons—and washed with that, and that was effective. I took it the third time, and steeped it again, and that was almost effective; so that I have used the first and second a good deal stronger than there was any need for. Evidently had I made fifteen gallons out of that quantity it would probably have been effective. Now, the reason I mention the saw fly was because of their going on a tree in the evening, and have their feed there in the morning, and go down in the ground during the day. Now, if that is the habit of this insect, probably by adding some resin, dissolving it in oil, and putting in a little glycerine, and covering your plant with it, it will catch it as it goes down or up, and hold it there, and you can catch it in that way.

MR. WAGENSELLER: I examined the bushes in the mornings and at noon and at various times in the day. I watched them more closely in the afternoons, when it was cooler, and I could always find them on the bushes; but along a little later in the season I found a great many in some dead leaves, that were where the bushes were, four or six inches from the ground—leaves from last year. They would curl in and hide in them. I also gathered quite a number, perhaps between forty and eighty. I put them in a half gallon fruit jar, and I had that half full of dirt. I put berries in that, and they would feed there. I would watch them and see them crawling all over that dirt, and they lived there for I don't know how many days; but I examined that dirt, and I found nothing in it, and don't know what became of them; they could not get out. I do not know what became of them, nor what kind of a state they turned into.

MR. WICKSON: As Mr. Wagenseller has mentioned sending me those worms, I can say a few words about them, but, unfortunately, not as much as I would like to. In the first place, they are not a saw fly. The larvæ is what they call true caterpillar. Saw fly larvæ is distinguishable from caterpillar larvæ. I could tell, beyond question, that it is a moth from the appearance of the larvæ, but just what moth cannot be told until we succeed in hatching them out, and those that he sent me unfortunately died, so that I was unable to get the moth. As Mr. Wilcox says, I think there is no doubt but what they are new, that is, to the gooseberry; but still, it may be some caterpillar, or some moth, that is known to naturalists to exist for some time feeding upon something else. It is not what is known as the ordinary gooseberry worm; it is not the saw fly; it is not another pest which you find in the berry, which lives in the berry, making its perforations in the berry, and afterwards the berry drops from the bushes; and it is not the gooseberry borer, of course; it is neither of these four. It is my opinion that Mr. Wagenseller has something new, and we rather hope he will keep it in his neighborhood. I advised him, first of all, to spray with something just at the time the blossom had set, which would discourage the moth from depositing eggs on the bushes. That is the best thing I could think of, and I thought a weak solution of whale-oil soap would be as apt to disgust the moth as anything he could use, and after that I advised him to put on one bush, merely for experiment, to cover it with musquito netting, and discover whether the pest came from the outside or up from the ground. I received, also, from Oregon, some bushes that were affected very much in the same way, but no worm. I think it possible that it is a pest from the north and may be working down this way, but it has not affected the large gooseberry districts of this State so far. I am sure of that.

Mr. Block: I did not mean to intimate that it was the saw fly, but simply suggested the remedy I am using on the saw fly.

Mr. Wickson: About your hellebore tea, that is excellent for leaf-eating insects, and one of the gooseberry pests does eat the leaves quite freely; but this worm, as I understand, does not pay much attention to the leaves.

Mr. Wagenseller: It takes the leaves after the berry has gone. It does not touch the currant, for I have the currant within four feet of them. It does not eat anything else I can find at all; but after the berries are gone it will take hold of the leaves.

Mr. Wickson: That prescription of Mr. Block's would cause it to fall from the leaves.

Mr. Wilcox: Hellebore is a specific remedy in the East for the currant worm. If this is anything like that it may prove equally effective.

Mr. Booth: It seems to me you are discussing an old friend of mine. I was raised in Lancastershire; and when I was a boy there was a pest on the gooseberry. It would first eat the gooseberry, and then the leaves—the same as the one we are considering. The way we got rid of them was to shake them off right on the ground, and while they were there we could very easily kill them. I never knew any name for them.

Mr. Gray: We have a worm in a garden at Chico that answers this description very closely. About two years ago a great number of bluish moths made their appearance, so that we saw them by the hundred or the thousand, you might say, all very active, and flying quite close to the ground. The moth is about the size of a codlin moth, or probably a little larger, of a very pale blue, or you might call it slate color. These are very destructive.

Mr. Wagenseller: I would like to ask Mr. Booth how he got rid of them.

Mr. Booth: I never knew what became of them. I was a boy at the time. All I remember is that my father used to put me to work to kill them, and I was thoroughly disgusted with them.

Mr. Weinstock: I desire to offer the following resolutions; they were read once this afternoon, but they have been altered and modified, so that, I believe, they will meet the views of almost all the growers who are present this afternoon. I read them, as modified, as follows:

Resolved, That the fruit growers assembled in State Convention do hereby recommend to the California Fruit Union, that at its next annual meeting, to take place January 19, 1887, the by-laws of that association be modified so as to embrace the following resolutions, namely: First, that all persons raising or shipping fruits for eastern markets be eligible to membership.

Resolved, That such association, through its management, appoint a commissioned agent in every eastern city that can use a carload or more of California fruits at a time, and that the management, by compiling such facts and statistics as may be at their command, arrange a table of distribution, subject to such changes and modifications as the market may from time to time demand. And it shall become the duty of the General Manager of such fruit to regulate the distribution of all fruits strictly in accordance with such provisions.

Resolved, That said management also establish regulations to control the quality, the weight, and the manner of packing all fruits offered for eastern shipment, and that its inspectors reject such fruits submitted for shipment as do not come up to the established requirements.

Resolved, That the eastern agents be instructed to sell all fruits which may be consigned to them by the Exchange, by auction, at public trade sales, and in no other way; the auctioneers' charges to be paid out of the commissions allowed these agents.

Resolved, That members of the Exchange shall be allowed the privilege of naming points of destination for their fruits, and the further privilege of naming their own consignees; and it shall be the duty of the General Manager to faithfully observe such wishes, provided, the space allotted to such points of destination be not all taken; and, provided, such members also instruct their consignees to sell their fruits by public auction, and at the same time and place at which the fruits consigned to the agents of the Exchange are sold. And, finally, be it

Resolved, That the management of said Exchange shall make such rules as will place all members on a level, and will make it impossible for any member or members to permanently monopolize any special market, to the exclusion of other members.

On motion of MR. BLOCK, the foregoing resolutions were ordered printed and distributed among the members, and discussion upon the same set for to-morrow afternoon, at two o'clock.

THE CHERRY.

MR. G. M. GRAY, of Chico, read the following essay on the cherry:

CHERRIES.

In the year 69, B. C., Lucullus, a Roman General, brought to Italy the first cherries of which I can find record. One hundred years later eight varieties were being cultivated in many parts of Europe. Very soon after the Pilgrim Fathers settled in this country they received seeds and buds from England and Holland; and to-day California is enjoying, to its fullest capacity, not only the profits but the satisfaction of producing the finest cherries, and in the largest quantity, of any State or nation. And from the time when George Washington tried his little ax on his father's cherry tree, down to the present, no variety of tree or fruit has given the horticulturist so much pride and real pleasure, as well as financial prosperity, as the cherry. And now, to bring the different steps of the production of the cherry tree and the fruit before this convention for discussion, we will divide it into five heads: First, stocks; second, setting out; third, pruning; fourth, picking and packing; fifth, market.

First—The stock mostly used in this State is the seedling, or wild cherry, many varieties of which are hardy and strong growers. The Mazard, which is a wild cherry of Europe, is considered by many to be preferable. Where dwarfed trees are desired the Mahaleb is the stock used.

Second—In setting out a cherry orchard select good, well drained, sandy loam, in as early a locality as possible, as it is "the early bird that catches the worm." It is a strange fact that cherries ripen as far north as Chico a week or ten days earlier than they do a hundred miles further south, and nearly, if not quite, as early as the noted Vacaville and Winters section. Plow at least twelve inches deep; twenty is better. Harrow well, and stake perfectly straight in each direction; trees to be thirty-three feet apart. This may seem too far to those who have not had experience with old orchards. At that distance they will lap limbs long before you will want to stop picking fruit from them. Dig the holes deep and broad, leaving the center of the bottom a little higher than outside. Cut off all bruised or broken roots. Spread well, and tramp the richest soil firmly around the roots, leaving the dirt loose on top, and a little lower than the margin.

Third—Immediately after setting out cut off your trees two feet from the ground, at an angle of forty-five degrees, leaving the last bud uninjured, about one half inch from the top; cover the top with hot wax; cut off all side limbs. At the second pruning leave three, four, or five limbs, twelve inches long; cut off all the rest; cut to an outside bud on the upright growing trees, and to an inside bud on the natural, spreading trees. At the third pruning cut back one half or two thirds; thin out to make a well balanced and good proportioned tree. The fourth and fifth pruning will be about the same. After that very little pruning will be necessary, except cutting out broken limbs, or where they rub, or lay in a mat. In cutting old cherry limbs always cut to a crotch, as stubs will die, and often kill the entire limb.. Be sure and remember the hot wax; it is not necessary on some kinds of trees, but is on cherry.

Fourth—The picking and packing of the cherry is one of the most important parts of the business, as carelessness in handling will surely bring ruin, and a clumsy fingered picker will make them cost a large part of the selling price. While some pickers seem to work hard to pick twelve boxes per day, some of the best will pick twenty-five boxes in the same time. I am satisfied we shall have to invent some better way of packing cherries before we shall succeed in shipping to distant points. The common cherry box will do for all points within four days, but very few that have been shipped more than that have paid expenses. The greatest of care must be taken in sorting and facing to make an attractive and satisfactory package.

Fifth—I hope the time is not far distant when we shall have this whole country for a market. What a treat it would be for the people of the Eastern States to be able to eat California cherries with the same flavor and relish that they have to us, and about the time that they are crawling out of their winter quarters where they have lived like a woodchuck in its hole for six or seven months. When that time does come, the "days of '49" will return to us once more, and the man that has a good cherry orchard will have a claim that cannot be jumped. But to accomplish this, some ingenious Yankee must discover some substance or car that will be an improvement on the present system; the railroad must put their trains through on better time, and the pompous express messengers must handle the boxes with very much more care than they do at present.

The Black Tartarian, Black Eagle, Black Republican, and Napoleon are the four best shippers. The Napoleon and the White Tartarian, and may be the Centennial, are the canning cherries. The Governor Wood, Elton, Coe's Transparent, and Mayduke are fine eating cherries, as are many other varieties. The Napoleon is the most productive. One tree on Rancho Chico produced seventeen hundred and fifty pounds at one picking; were sold to the cannery for 5 cents per pound. Counting forty-four trees per acre, would give at the rate of $3,850 per acre. How many ranches will it take to raise that amount in wheat?

The gopher is the horticulturist's greatest enemy in the cherry orchard as well as all others. Many large trees in all parts of the State have been ruined by being girdled below the ground, and the first knowledge of the destruction is the withered leaves, and the tree is gone. The most successful remedy is to dig down to their runways, drop in parsley or celery root with strychnine on it, and cover up the hole. A few may be killed by smokers, but I have very little faith in them unless it were in very firm ground.

A Delegate: I would like to ask Mr. Gray if the Napoleon is what they call the Royal Anne?

Mr. Gray: The same thing.

Mr. Wagenseller: Is the gopher more fond of the cherry than any other?

Mr. Gray: They are so fond of them, that they do a great deal of damage, and they have no respect for the age of the tree. They would just as soon have an old tree as a young one. You will not find a cherry orchard in the State, where you will not find vacant places, probably nine cases out of ten. It is occasioned by these gophers, for if you dig down, you will find the roots cut off a foot or a foot and a half below the ground. There may be other reasons why a cherry tree dies occasionally, but I think that is the principal reason, and they will work on all kinds of cherry stock.

Mr. Wagenseller: Eleven or twelve years ago, I planted out three hundred and twenty-five trees and enough since then to make it five hundred, and at the present time I suppose I have not more than fifty. They died from various causes, but I had not thought of the gopher. I have not examined the roots.

Mr. Gray: You may all know when a tree is entirely girdled right down to the solid wood, either above or below, it is sure death, unless new bark is formed, which sometimes is done by covering up at once; but then there is very little hope of a tree that is girdled clear around.

Mr. Wagenseller: My ground is very rich. It stands high, and I have been told that it is too rich for the cherry. I have a neighbor two hundred yards from where I am. He has the Royal Anne, and Black Tartarian that stands where there has been no cultivation for the last ten years at all, and those trees bear abundantly.

Mr. Klee: A few words in regard to the non-bearing of cherry trees. I think there is a number of sections in this State where the cherry tree don't bear. It happens to be so in a little place I own in the Santa Cruz Mountains. The cherry trees hardly ever bear. It is not the want of fruit spurs, because the trees are full, and bloom well, but the cherries always drop. They are on fine, moist land. I have also older trees that act the same way, and that ground is dry. I had an idea that it is due to the climate more than to anything else, but my neighbors' trees acted differently. I presumed that it might be due, perhaps, to too much moisture in the soil at the time of bloom. That has been my idea, and I think that may be the case. The tree will grow tremendously, and everything around will bear except those. I have heard that several cases are known in the State where cherry trees did not bear, and after they allowed them to do without cultivation at all, they commenced bearing. It is possible that that is the true fact of the case.

Mr. Tompkins: In our neighborhood, near San Leandro, I notice a number of orchards that never bear at all. There is one man has an orchard of Napoleon Bigarreau that never in fifteen years have borne once. My next neighbor has trees six years old that never bore at all. There is another large orchard one quarter of a mile away, eight or nine years old, fine large trees that have never borne. The first orchard seemed to grow too well; they have been cultivated very well. This other orchard I think has been cropped to death. It had the most exhausting kind of crops for years; raised hay, beets, carrots, and everything you could think of in between. I think in those two ways you can easily spoil a very promising cherry orchard.

Mr. Klee: Neither of those two cases applied to my trees. They are in excellent condition. Good soil, well drained; everything about them does well—plums, apricots, apples, and peaches—everything does well, only the cherries won't bear.

Mr. Wagenseller: The man I got my trees from raised very fine cherries on what I would call good second rate land, kind of gravelly, while mine is in the valley, as good land as there is. I have got the same trees, and his raise an abundant crop.

Mr. Block: Mr. Gray has directed attention to the packing of the cherry. I have a suggestion to make, which I know has been tried with better effect than the usual mode, and that is, in using the cherry box that has been used in most sections. I suppose it is called the ten-pound box, and to put in the center of it an end of the same size they put in on the end. It answers a double purpose. First, when the cherries are put in on top of each other, the strength of that board will keep the other from pressing down the cherries, and it is a conductor of heat. The division will not reduce the quantity of cherries, and you can pack them much easier and hold them better in position, and in carrying it will assist in protecting the cherry from getting jammed. I would also suggest to have several holes bored in the top and bottom, to give them more ventilation.

Mr. Routier: I planted cherry trees in 1870, and it was over ten years before I had a cherry at all. Those trees are now sixteen years old, and I do not believe I had more than four crops up to now—they want age.

Mr. Shinn: I agree with Senator Routier, that they want age. I have on my place Royal Anne trees twelve years old, and some of them have borne a couple of moderate crops, but numbers of them have not borne a crop yet; but I have no discouragements about that, and, I have no doubt they will bear in time. My observation is, that in many parts of the State, cherry culture is a very great success, and is a profitable crop. Black Tartarian bears early; Governor Wood bears early; Rockport Bigarreau bears early. As suggested by Mr. Gray, if some means could be provided by which they could be carried as far east as Chicago, in good condition, we might grow just as many as we pleased. The Black Tartarian is a tender cherry, that could not, perhaps, be carried so far. There is no question but what Napoleon, or even the Rockport, and the Black Republican, as it is called, they can be carried as far as that with fast freight.

Mr. Gray: I made a little experiment last summer. I sent two boxes to Washington, one of Napoleon and one of the Black Tartarian. It was not very successful, that is, it was sent by express, and usually such packages are packed in the cars without any ventilation at all, and you don't expect very good results. But I packed these to see how they would go, by putting one layer of cherries, as I would fix up the box, and then four or five thicknesses of paper, and then another row, and filled one box in that way; and then I filled another, by putting in a false bottom, having two rows of cherries, with paper between, and then a bottom, and then two rows more on top. Some of them reached Washington, so that they could be eaten, and some of them didn't. Really, it was not a very successful experiment.

W. J. Wilson, of Newcastle: I have had a little experience in shipping cherries the last two years. We have got a box at Newcastle, I think it is two inches deep and about the usual size, and to hold the same amount of cherries as the old box, but we have shipped both to Leadville, and they tell us to send them over the old box. They said the cherries always carried fine in the small peach boxes, but not to send them in the large boxes; consequently we have abandoned the large boxes altogether. I have got two trees in my place that I planted in 1868, and never got as many cherries off those two trees as I could eat, and I have just really given up thinking of cultivating them any more. I have been told several times, there was first one remedy and then another, and I went one time and dug around the trees about six feet, dug everything down nearly four feet, and cut all the roots off, and the next year I got about as many cherries off of them as I would hold in the palm of my hand. Another neighbor told me to drive nails into it, and I went to work and drove in half a keg of nails and got nothing for it, and the tree is standing yet, and I don't suppose I will ever get anything off of it any more. I have got other trees I planted three years ago this last spring, and they are as thick around as those posts, and I have taken off the last year sixty-two boxes of cherries from it, and I am pleased with the success of it, and I would like to find out what I am going to do with the two trees that won't bear.

MR. GRAY: There is something, I think, in the cherry tree, about the fertilizing, that it is necessary to have various buds together; that is, to have a mixture in the cherry orchard. You will notice that wherever there is one row standing by itself that they never will do as well as they do in a body, or in a square, a thing that has been noticed by almost any one who has cherry trees; that where you find one single row that the trees do not do as well, or do not bear as well. It may be something in fertilizing; but this idea of cherry trees not bearing is something new to me. With us, at Chico, you get sick of picking from the twenty-fifth of April to the fifth of June. We have cherries there for six weeks, picking every day, except Sundays.

COL. A. ANDREWS, of San Francisco, here addressed the convention with reference to an exhibition of California products at the coming American Exposition.

The convention then adjourned until Thursday morning, at nine o'clock.

FOURTH DAY'S PROCEEDINGS.

SACRAMENTO, November 18, 1886.

The Chairman read a telegram from Governor Stanford, as follows:

SAN FRANCISCO, November 18, 1886.

ELLWOOD COOPER, *President State Board Horticulture, Sacramento:*

In consequence of pressing business engagements, am unable to accept your kind invitation.

LELAND STANFORD.

The Chair announced the following committee on fruit packages: Gilbert Tompkins, of Alameda; R. B. Blowers, of Woodland; Senator L. W. Buck, of Vacaville.

MR. JAMES SHINN, of Niles, read the following essay on the

APPLE.

I somewhat reluctantly accepted the invitation of the State Board at the last annual convention, to prepare an essay upon the apple and its culture, to be read at this meeting, because only three years ago I read a brief paper upon the same subject. As I must necessarily occupy, in a measure at least, the same ground as then taken, I may be charged with repetition.

I shall not enter upon an exhaustive history of the apple in the long past ages, whether our first parents had this fruit in Eden, whether "the fruit of that forbidden tree, whose mortal taste brought Death into the world, and all our woe," was, or was not the apple, does not much concern us at this day. We are much more concerned to find a remedy for the codlin moth evil.

Unquestionably the apple was known and highly esteemed almost from time immemorial. More than twenty varieties of this fruit were known and described in the days of the Cæsars. The apple is indigenous to most parts of Europe, and is found wild from Siberia to the Mediterranean. The present improved varieties were probably propagated by slow degrees from some of these wild crabapples. The history of the apple in the United States is free from all obscurity. The early settlers of the Atlantic seaboard brought apple seed from the old country, some from England, some from Germany and Holland, and some even brought a few trees. As the first grown trees bore fruit, the seeds of the best varieties were selected and planted, and so a large number of varieties were produced and scattered far and wide, until the number of varieties is almost without number. Before long, efforts began to be made to perpetuate the best varieties by grafting. Nurseries were established for this purpose, and though the number now grown is very greatly too large, yet much has been done in the various portions of our country to confine cultivation to a comparatively small number of the best varieties. The wild or crabapple is found in all parts of this continent, but no effort has been made, so far as is publicly known, to improve upon them, as it was much easier for the first settlers to avail themselves of improvements already made. The apple has always held a very high rank among cultivated fruits, not because it is the highest flavored, or more delicious to the taste than that of any other fruit, for it is not. Several of our fruits might be named that rank higher in this respect. But the apple as a whole, or when considered with reference to its many good qualities, may safely be given the very first rank. This fruit is grown almost everywhere throughout the temperate zone. It is not especially fastidious with respect to soils. It prefers certain soils, but will give fair returns upon a great variety. The trees are very healthy, and long lived, often bearing fruit fifty years, and sometimes for a full century. The fruit, with proper regard to varieties, may be had for domestic use the entire year, and may be used in domestic and culinary ways so varied, that the claim for preëminence for the apple is well sustained.

Soils.

The apple may be grown upon a great variety of soils. Soils that are very wet, and soils composed of pure sand, constitute almost the only exceptions. The soil in which the apple most delights, however, is one composed of strong, deep calcareous loam, with more or less potash—a soil not so heavy and tough as to be difficult to pulverize, nor so light as to be lacking in the power of retaining moisture in dry seasons. Alluvial soils, as found on the banks of rivers and streams, when not too wholly composed of vegetable matter, have been found suitable for the apple, though sometimes found deficient in some properties necessary to long continued fruitfulness of the trees. Any good wheat soil may be safely planted to the apple. The general characteristics of the soil most suitable for the apple may be seen by an analysis of the ashes of the wood of the tree. It is found that the matter of the ash consists largely of lime—potash, and phosphate of lime. These constitute about half of the whole matter; carbonic acid about another fourth.

This analysis not only shows what natural properties should be sought for in the choice of ground for an apple orchard, but also clearly indicates what kind of manures may be needed to recuperate old or worn out orchards. Lime, ground bones, wood ashes, charcoal, are all indicated as proper manures for apple orchards. It need not be said that common barnyard manures are always proper.

Pruning.

So many theories have been entertained respecting the objects to be sought in pruning orchard trees, and the practice to be adopted, that I almost hesitate to form an opinion. Several eastern writers on this subject condemn all pruning except to remove dead or crossing branches. No less an authority than A. J. Downing says, and puts the lines in italics: "Every fruit tree grown in the open orchard or garden as a common standard, should be allowed to take its natural form; the whole effort of the pruner going no further than to take out all weak and crooked branches."

On the other hand, both Thomas and Barry advocate the free use of the saw and knife, even upon bearing trees. When doctors disagree, who shall decide?

I remark that the subject of pruning fruit trees is one of much importance. Whatever may be the practice on the other side of the continent, where orchard trees are much slower in growth than here, it is essential in the management of orchard trees in this country that they be carefully pruned and trained during several years, at least, after being planted in orchard. The future usefulness, to say nothing of the beauty and symmetry of trees, depends much upon the judgment with which they are treated when young. For, "just as the twig is bent, the tree's inclined." In California, apple trees are commonly transplanted in orchard at the age of one year from the graft. They are generally from four to six feet in height, and without side branches, or, if any, but few near the top. These trees should be cut back, before beginning to grow, to a point from which the owner wishes to start the foundation of the superstructure, so to speak. This point may be at the height of sixteen or eighteen inches, or twenty-four, or thirty, according to the taste or judgment of the proprietor. It is desirable, on several accounts, to start the future head of the tree as low as practicable; and this is especially true in all warm valleys. The point at which the young tree is cut back should be carefully chosen, so as to leave a good bud a very little below the cut, and on the windward side of the tree. Several branches may be expected to start out near the top of the stump. About three of these ought to be selected to remain, and so chosen as to balance the growth on all sides of the tree, and all other sprouts may be rubbed off. The three chosen branches may be allowed to grow until the next winter, when they are all to be cut back, say twelve to sixteen inches from the main stem. As before, this cutting should be made just above a good, strong bud. But another principle now comes in for notice. If the tree to be pruned is of a variety whose natural habit is to make a broad and spreading head, as the Rhode Island Greening apple, for instance, the branch should be cut so as to leave the upper bud upon the inner side of it. But if the tree is one whose nature is to form a close, upright head, then the cut should be immediately above an outside bud. As the previous year, so now, several branches may be expected to start out upon each one of the stems so cut back. Two of these should be selected to remain, and all others early destroyed. From year to year the same general system will be pursued, until the tree comes into bearing, and as much longer as they continue to throw out long branches of several feet in length.

The foregoing rules for pruning are not intended to be dogmatic, but only suggestive. No doubt, some may prefer to leave a larger number of branches, at the first and second pruning, and to cut back, more or less, than is above suggested. But, probably, it will be generally agreed that the main idea is correct, viz.: that young trees should be so pruned and trained, that when grown, they should have low, open, and spreading heads.

Orchardists on this coast need hardly be reminded that the ground in an orchard should be well cultivated and kept clean and mellow. No other trees or plants should be grown in orchards, especially after they come into bearing. The least objectionable plants to be grown in an orchard, would probably be vines—squash or pumpkin. These derive much of their support from the atmosphere; and the broad leaves of these plants would afford some protection against the effects of hot weather upon the stems of young trees. But, in my judgment, young trees may be more readily protected from the borers in some other way.

This subject of the thorough and clean cultivation of our orchards, is one of much importance. It is not too much to say, that much of our success in fruit growing depends upon it. One of the ablest of the eastern writers upon fruit culture, says: "It is indispensably requisite, that in all young orchards the ground should be kept loose and mellow by cultivation." Another able writer insists upon clean, mellow cultivation of orchards, and shows, by various examples, that fruit grown in well cultivated orchards, is always larger and better than that grown in orchards where grass, or anything else is grown. Now, if this practice is wise in those States, where rain falls freely all the season, how much more on this coast, where almost no rain falls during the entire season?

Varieties.

I come now to speak of the proper varieties to grow in California. I remark, first, that no one list of varieties could be mentioned that would be exactly adapted to all the sections and districts of this State. Certain varieties seem to succeed in one section, but not so well in another. It has been observed that apples, as a rule, succeed best in the places where they were originated. For example: The Baldwin and Roxbury Russet are nowhere so good as in Massachusetts. The Spitzenberg and Northern Spy nowhere equal to those grown in New York. The same may be said of several southern varieties. They lose more or less in quality when carried far from the place of their nativity. There are, of course, some exceptions to this rule. The Yellow Bell Fleur, which originated on the sandy soil of New Jersey, seems capable of adapting itself to all light soils, and over large sections of our country.

The planter of a small orchard only for domestic use will of course select a line of varieties with special reference to this object. He will need a few of the earliest summer, the fall apples, and the late keepers. But he who plants with a view to profit from the sale of the fruit, has need of good judgment in the selection of varieties. As a general rule, it will be wise to plant such varieties as have already been proved suited to the section or locality where it is proposed to plant. Again, it may be safely recommended to all planters of apple trees to plant but *few* varieties. I will not suggest exactly how many, whether five or ten, but certainly very few. There will be great temptation to plant too many sorts; it will be found hard to pass by this, that, and the other well known varieties, and out of several hundred candidates for favor to ignore all but a half dozen. But the most important question for any one who proposes to plant an apple orchard, will be—can it be made profitable? Is it probable that the production of apples in this State can be made profitable to the grower? This question was brought up during a recent discussion by the State Horticultural Society. Mr. Senator DeLong, of Marin County, a large grower of this fruit, was asked the question, "Is it profitable, or can the growth of apples be made profitable in this State?" His answer was: "Yes, if you grow *good* apples." After a careful consideration of the subject, I cordially indorse that reply to the question. There is every reason to expect good prices for good apples, as many as can be produced, for a long time to come, and when it is considered that a good apple orchard well cared for may last and bear fruit for fifty years or more, and that sometimes may bear, and do bear, fifty or more bushels of fruit in a single season, it must be apparent that apple growing in this State will be profitable *if* we can grow *good* apples. And now comes the crucial question, *can we grow good apples?* Upon the answer to this question depends the fate of this great interest. Unless an effectual remedy can be found against the ravages of the apple worm, it must be admitted that apples cannot be grown profitably. And the same is true of pear culture. I do not propose here to enter into a full discussion of this exhaustless subject, as I know that we shall have reports from the officers of the State Board, which will treat of the whole subject of insect pests, and of the best remedies known for their extirpation.

In searching the history of the ravages of the apple worm, on the eastern side of the continent, I find that it is everywhere considered a great evil; and some seasons much loss is sustained through its attacks upon fruit. All writers upon the subject agree that the first brood of the moths deposit their eggs in the calyx of the fruit, when the fruit is quite small—so small that it cannot live after the larvæ has eaten out the core, or interior of the fruit. The young apples and pears thus affected are pretty sure to fall from the tree before the worm has left them. And these writers all insist that if these fallen fruits are promptly gathered and destroyed, or if hogs are kept in the orchards, so that the fruit may be all eaten by them daily, that then the second brood of moths will be comparatively small; and as they have but two broods of this insect to deal with, it will be readily understood that they have no great difficulty in keeping this insect within reasonable bounds. But, alas! our circumstances are materially different from theirs. Our delightful climate, with almost no winter, while it gives us infinite advantages in every branch of fruit culture, at the same time exposes us to the ravages of many insect pests, of which the fruit grower of the Eastern States knows but little. Their winters are so long and so severe that very few of the larvæ of the codlin moth can survive till spring. Consequently, the first brood is small; and some writers say this is the only brood for the season, though most authorities admit that they have a second brood, but never a third. Our difficulty in managing this great enemy is very much greater. Our winters are so short and so mild that a large proportion of the larvæ of all classes of millers are well preserved, and are ready to send out large broods of winged pests exactly at the time when nature has provided them an inviting feast of apples and pears. Now, as the first brood of the season is so large, it follows, generally, that the second brood is still larger, notwithstanding all our efforts to destroy the first crop of worms. But this does not end our warfare. We are sure of a third hatching, at least, and perhaps a fourth. Whenever a third crop of moths deposits an egg upon an apple or pear, that apple or pear is ruined; and as the third brood is always much the largest, it is evident that the destruction will be proportionate; and it is also evident that the number of larvæ that go into winter quarters for hibernation through the winter will always be large, so that we may depend upon a fine early brood next spring. No one who fairly and fully examines this subject can fail to feel great apprehensions concerning the future of this important branch of our fruit culture. I only remark concerning other insect pests—scale, canker worms, caterpillars, woolly aphis, etc.—that with constant care and watchfulness, and the application of known remedies, all these can be destroyed, or at least kept within safe limits.

Mr. L. F. Moulton read an essay:

THE FRUIT INTEREST IN THE GREAT NORTHERN SACRAMENTO BASIN.

Our northern valley counties are destined to excel in orchards and vineyards to the same extent that they have already excelled in the production of cereals and live stock.

For years the central county of this great basin has been the banner wheat county of the State, as well as of the United States; for years it has produced one sixth of all the wheat grown in the State of California; for years it has ranked the first in the State of California, and the fifteenth in the United States, in the value of her agricultural products.

To-day she stands in the front and confidently challenges all competitors in the race for supremacy; to-day she recognizes that wheat, so long her king, must give way to the fruit tree and the vine, and that her princely land-holdings must yield up to the subdivisions of the progressive newcomer; to-day she goes forth in the pride of her young strength, to take her true station in that higher civilization and power that is begotten of a higher intelligence and industry than that simply which casts abroad the seed for thousands and thousands of acres of grain, and, idly waiting for harvest, then gathers in machine-like the fruit of earth's fertility and the seasons' beneficence; to-day, in fact and in truth, she takes hold of fruit trees and vines with the vim she has always shown, and that shall give her the same rank in these greater, higher industries, that she has held in other industries in the past.

Her rich and fertile soil, her mild climate, her majestic river—the Sacramento—her luxuriant vegetation, have, through centuries of the past, ministered to the wants, necessities, and comforts of man and beast alike. Long before its occupation by our people, long before the great continental divide had been pierced by the extreme advance of our boldest explorers, was Colusa, one of these northern valley counties, the very center of savage life in our great valley. Where now is the town of Colusa, where now the iron horse comes daily snorting in and stamps impatient for its mighty burdens to be removed, is the very site of the red man's great temple of worship, legislation, and justice. This very spot, where now the shrill whistle daily proclaims a new civilization, was to the savage mind most sacred ground. Most undeniable is the proof of the inherent value of her soil, the beneficence of her climate, and the purity and healthfulness of her crystal river, when it is known that in savage days, in barbarous times, when all tribes of men relied on earth's spontaneous productions, there were in this tribe of Indians that occupied the site of the present town of

Colusa, thousands of members, while other tribes numbered probably one tenth as many, and that *all* acknowledged the Colusa tribe as the lawgivers, and their village as the capital of the whole country.

But few of this once powerful tribe now remain to tell the sad tale of modern whisky and white man's civilization; yet the well established fact still remains, and will ever remain, that this county *then* was, as it *now* is, the very center of our great valley's manifest fertility.

But, to come to our subject. From wheat to what? This is the anxious and oft-repeated query of the pale-faced tribe of to-day. Turn where they may, revolve the question as they will, all reach the same conclusion, that the fruit and the vine *must* be everywhere accepted. This conclusion reached, comes then the more earnest individual question—what varieties?

Foremost in the list most desirable for these northern valley counties, may be named all the varieties, both citrus and deciduous, as well as raisin and shipping grapes; the muscatelle flourishes wonderfully in our best soils, and produces raisins that can hardly be excelled anywhere. The apricot is a leading fruit for our higher and drier soils, of which we have thousands of acres perfectly adapted to its growth. While in many parts of the State the apricot is being dug up on account of imperfect fruit and blighted crops, *here* in these counties the yield is abundant and certain, and the fruit is entirely free of spots and knots; it is of a rich, golden hue and delicious flavor. This fruit will probably be more extensively dried, canned, and shipped to the marts of the world than any other fruit grown in this locality.

The French prune and other varieties of prunes can and will be very extensively and successfully raised here; for the few bearing trees we have are producing in different kinds of soil, most admirable fruit, all of the choicest flavor. Many of the leading varieties of plums attain to the greatest perfection and excellence, as in the case of the prune or drying plum. The curiculio has not as yet been presented to us by our eastern neighbors, to destroy our prunes and plums, and we may therefore, by keeping free of this pest, most successfully compete with the Eastern States, and even with Europe, in the production of these fruits.

The Bartlett pear is a most vigorous grower in our soil and climate, and will flourish between our mile apart levees.

The fig is as much at home in our rich soil and genial sun, as an elder bush or a wild grapevine in an old Indian rancheria. There are now growing in Colusa, trees bearing a fig of the very best flavor, appearance, and quality, a successful drier, and making a perfect and exceedingly rich dried product.

According to the best of authority, the date palm will be entirely at home in our soil, under our almost tropical sun.

So of the olive. I have, myself, raised in four years from the cutting, with but very little care, the finest of olives. The tree is as tenacious of life as the morning glory, or the cat-with-nine-lives; so tenacious, in fact, that some even claim that it thrives best in poor soil, and on rocky, barren ground. But this I do not believe.

The almond never had a better home. I have in my grounds, pomegranates, Japanese persimmons, palms, limes, lemons, citrons, and oranges, all growing in the open air. The oranges are now of a bright golden color and possess a delicious flavor. They are two months earlier than the far famed southern oranges; in fact, our oranges are all past ripe before the southern, or Los Angeles, or famous Riverside oranges are fit to eat.

The temperature here does not fall below that reached in the southern part of the State, and our trees do not need any more protection than in the south. Orange trees raised from orange seed, and grown in this climate, do well without any protection. But they should have good, rich soil and plenty of water all the year round, to keep up the greatest degree of vitality, thus enabling them to resist frost and insect pests. One special advantage we have, apparently, over the lower altitudes and damper atmosphere is, that the hot sun seems to kill all scales; or, at any rate, the scale does not seem to thrive or survive in our drier atmosphere.

I had last year here on exhibition at the Citrus Fair, some oranges equal to the best of any country, and a Los Angeles paper in noticing the fact, humorously said that I had procured six thousand orange trees from Los Angeles, and that only one had escaped "froze-to-death," and that one I had "blanketed." We of this great basin do not have to resort to those means to protect our citrus trees from excessive cold, as may be the case in other sections. Just as wheat in the past has held full sway, so in the future will apricots, prunes, plums, pears, peaches, nectarines, cherries, apples, walnuts, figs, olives, lemons, oranges, and limes, as well as grapes, equal to the best in the world, from these northern valley counties, take the lead in tempting both the palate and the eye of eastern buyers; and first shall reap the greatest reward, and first shall be introduced to the markets of the country. Those of our people who first, realizing the true situation, shall change from wheat to fruit, shall prosper most.

In addition to the question of varieties of trees and vines, there should be especially considered by beginners the stock and seeds from which the plants offered for sale have been grown. Instead of offering stock produced from seeds procured from the Southern States or elsewhere from trees that are seedlings for many generations back, the country has been flooded with trash that has been produced from trashy seeds, procured promiscuously from canneries, or produced from budded-to-death trees, or from suckers or little pieces of roots cut up and grafted into and called a tree; or else, most of all, the common practice of using cuttings from the French Myrobolan seedlings, or cutting into small pieces this desirable imported stock to save cost of the genuine natural tree. These tricky methods should be discouraged alike by both nurserymen and fruit growers everywhere. No wise fruit grower will ever trust such worthless trash as results from these pernicious practices.

Another important subject connected with fruit growing, is irrigation. Through the protection afforded by what has been derisively known as Moulton's mile-apart levee theory, we are now enabled to carry the water safely through our county, between widely separated, or mile-apart levees, subject, of course, to occasional breaks in such levees, as are set up on edge and occupied by gophers, squirrels, and sleepy-headed settlers. Yet even in these neglected sections, indolence, contrary to established rule, has a rich reward in a fertilizing coating of rich river sediment. And here is to be seen convincing proof of the value of my long ago, and oft expressed theories of winter flooding; for, with the surface of the river raised by and between mile-apart levees, the water, now in moderate floods, rises above the highest river bank land, making it possible to deposit on all these orchards and vineyards its rich sedimentary washings. And, further, from these highest land surfaces, it is with the utmost ease that the water is let out into the highest pens or checks, and from these into the next, and so on until all the water is consumed, or allowed, if desired, to run down into the lower ponds or channels on either side of the river, and thence on down to the sea.

And, I now recommend, in addition to my old winter-flooding pen or check theories, that there should be left in the levees, on both sides of the river, say three miles apart, and nearest to high bank sloughs, overfalls, two hundred feet long, with aprons, to lower this richest of plant food and drink down into these natural canals, to be in turn there held between levees on the banks, and let out into highest pens or checks, and so on successively as far as may be desired, the same as through the pens or checks adjoining the river itself. This overfall would make it impossible for extreme floods to burst well made levees in the lower places, suffered to exist by lazy, sleepy-headed orchardists, and river bank dwellers, as then the excess of water would flow out over the land, and effectually settle the great question of irrigation. I have always held, on the question of winter flooding, leveeing, controlling of river waters, and the suppression of the slickens fiend, that there was one simple principle of right, that should be recognized by our legislative and judicial powers: and that is, that the settler occupying banks of "dry sloughs" formed by the action of water, should be declared a "riparian proprietor," with a right to demand that during flood times of flowing streams, water sufficient for his individual purposes be allowed to flow through flood-gates substantially erected under direction of the Board of Supervisors, at the point where such slough puts out from the flowing stream, but not, however, to the injury of any other proprietor below him, who might not require any water. This would completely settle my plan of winter flooding, as it would, except for gardens and Chili clover, afford abundance of water for all purposes, to all land owners; for one good flooding in winter is all that is needed under any circumstances, for orchards or vineyards, if followed up by thorough cultivation. With canals that appear on the northern county maps perfected, and the above ideas and theories carried out to the utilization of all the surplus waters of our rivers and our many mountain streams, nearly every part of our immense valley would be made to flourish, prosper, and abound in almost every kind of plant, tree, and vine now known to the most favored portions of the whole world.

Then with the transportation problem to eastern markets more effectually and satisfactorily settled, no country that greets the sun in his daily course could show a more happy, contented, or prosperous people than would these northern counties of California.

The great question of reaching the markets of our own metropolis, and the line of transportation to more distant markets, was solved for us long ages ago. There flows through this great valley the noble Sacramento, that constitutes the only railroad commission that the transportation lords of to-day admit they have as yet failed to buy. Holding thus the balance of power, our narrow and our broad gauge railroads are brought nearer to the service of the people; and there is insured to us for all time unusual facilities for the transportation of our varied products.

If now still lower rates can be secured to eastern markets, on daily cars that shall be required to receive *any quantity* of fruit, however small the lot, there will be but little else needed to stimulate our people to the greatest activity in the planting of trees and vines.

These northern counties stretch out their broad and fertile area in sight of the snow-capped Sierras on the east, and cold Mt. Shasta's eternal snows on the north. They are within a few hours of romantic and picturesque rides on our railroads to the health-giving mineral springs on the west; to the streams and lakes abounding in fish, and forests overrun with game, where the tourist or the husbandman may drink in a day of pleasure in these richest of nature's grandest gifts to man, and return home at eve to enter with renewed vigor on the morrow's duties and labors.

Here in this modern Italy, choicer than Italian vines and trees, rarest of tropical fruits, shrubs, and flowers, the cool, refreshing breath of old ocean from the west, and of white Lassen peak on the east, the majestic, crystal Sacramento, fed by melting snows and mountain springs flowing past our doors, and carrying on its bosom boats freighted with the product of our fields of golden grain, and fruit and vine, out through Golden Gate to broad old ocean, to return with the golden luxuries of other climes to cheer and beautify prosperous and happy homes, all contribute their golden wealth and conspire to make these counties truly the golden counties of the golden State.

Mr. W. H. Aiken, of Wrights, Santa Clara County, read an essay on the prune, and presented to the State Board of Horticulture, and exhibited to the convention, a display of the different varieties of prunes; and, on motion of Mr. Wilcox, it was agreed that this exhibit be preserved and sent to Colonel Andrews for an exhibit at the fair referred to. The essay is as follows:

THE PRUNE.

The word prune is derived from the Latin *prunum*, which means plum, and may be more specifically defined as a plum of firm texture, easily dried whole in the sun, or by artificial heat, without fermenting at the pit.

Prune culture in this State has become a large and growing industry, and to successfully compete with foreign prunes, a protective tariff, an intelligent culture of the trees, and the best method of curing the fruit are indispensable.

The policy of this Government is, and has been from its foundation, the protection of home industries and manufactures by proper duties upon foreign imports.

The products of the soil have not been protected to the same extent or degree as manufactured articles so much used by the farmer, and especially is this so with the prune. The tariff of 1 cent per pound on prunes was fixed before they were raised to any extent in this country, and was rated for purpose of revenue, and not protection, as appears from the fact that the ad valorem duty on prunes amounts to only 18½ per cent, while the average ad valorem rate of duty on all articles is 42½ per cent.

The importation of prunes for the year ending June 30, 1885, was fifty-seven million six hundred and thirty-one thousand eight hundred and twenty pounds, valued by importers at $2,147,505; and for the year ending June 30, 1886, sixty-four millions nine hundred and ninety-five thousand five hundred and forty-seven pounds, valued at $2,026,595, showing an increased importation in 1886 of seven millions three hundred and sixty-three thousand seven hundred and twenty-five pounds, but a decrease in value of $120,910.

The prune product of California for the year ending June 30, 1885, was estimated at one million eight hundred and seventy-five thousand pounds, of the value of $150,000, at 8 cents per pound. For the year ending June 3, 1886, one million five hundred and fifty thousand pounds, valued at $93,000, at 6 cents per pound, showing a falling off in production of three hundred and twenty-five thousand pounds, and in value of $57,000.

The explanation of this is that there was not sufficient rainfall last year to mature a large prune that would command a fair price in competition with an unusually large and cheap importation.

The prune crop of this year is still in the hands of the producer, and cannot be definitely estimated; but it may be safely said, judging from the good quality and fair quantity on the trees, and the increased bearing acreage, that it will amount to about two million pounds, which, at 8 cents per pound (a low price for so good an article), would yield the producer $160,000.

The names of prunes cultivated here are French, German, Italian, Hungarian, Bulgarian, and Silver prunes.

French Prune.

The French prune has been extensively and profitably grown in certain sections of this State, where the soil, climate, and other conditions have proved favorable.

The first trees of the kind were grown by Louis Pellier, at San José, about the year 1857, the graft having been brought from France by his brother in December, 1856.

The French prunes which are so largely exported from France are made of the Prune d'Agen, or date plum, which is also named Prune d'Ente and Robe de Sargent. The Prune d'Agen is, according to the best authorities, the plum from which the finest French prunes are made, and is known as the prune of commerce. Orchards have been planted and cultivated in California for nearly thirty years, under the impression that we had the true prune of commerce, cultivated in France under the name of Prune d'Agen.

This was first seriously questioned by Mr. Felix Gillet, a Frenchman by birth, and a prominent and enterprising nurseryman at Nevada City, California, who asserted in July, 1884, that our French prune was very different from the Prune d'Agen of France, both in size, color, shape, and time of maturity.

He based his opinion upon the conclusions drawn by certain horticulturists in France, from an actual comparison of the prunes raised and sent to them by him for that purpose with what they claimed was the true Prune d'Agen.

They failed to agree upon the points of difference, one insisting that the California prune is a seedling from the Prune d'Agen, and not as large and fine; another, that it is the same in shape, but not so regularly ovoid; another, that it is the same shape and color, but that there is a difference in the pit; and still another, a leading prune merchant of Agen, France, that it is exactly the kind known in France by the name of Prune d'Agen, or Prune d'Ente, and that the nature of the soil has much to do with the beauty and size of the fruit.

Mr. Gillet, desiring to correct the error, and to introduce in California the Prune d'Agen, obtained trees from the north and south of France, and spared no expense in fully investigating the prune subject, and kept the people advised of his progress from time to time through the "Rural Press."

His investigations up to November, 1885, resulted in a change of opinion, as shown in his letter to the State Horticultural Society, in which he makes the following statement: "Our prune is a true type of the Prune d'Agen, and the kind grown in the north of France and the Valley of the Loire is a very poor type of that famous prune." Our prune is not the very type of the Prune d'Agen, cultivated in the Valley of the Lot, in France, where are grown the largest prunes, which are sold by merchants of Agen and Bordeaux under the name of Prune d'Ente or d'Agen.

Through the kindness of Mr. Gillet, I sent to a horticulturist at Agen a small package of my own prunes for inspection. In reply, under date of August 16, 1886, he states that my prune has the shape and color of the

Prune d'Agen, but is not the same type, the difference being in the pit, and sent me two pits of his prunes for inspection and comparison.

I am of the opinion that the French prune of this State is a true type of the Prune d'Agen, the prune of commerce of France, resembling it in shape and color, though differing it may be in pit; the exact difference I am unable upon inspection to clearly define. This slight difference may be owing to climatic influence.

Whether the exact type of the prune grown in the Valley of the Lot, in France, would prove a better and more profitable prune if grown in California than the one we have, is a matter for future experiment and consideration.

"Prove all things and hold fast that which is good."

The German prune is not generally grown; but as it contains more acid than the French, is preferred by some.

The Italian, or Fallenberg prune, sometimes called German, is quite well known; it has a rich acid flavor, is of a dark color with blue tint, and is nearly round.

The fruit thins itself, and often rather too much for profit, so that a full crop cannot be depended upon each year.

The Hungarian prune was brought to San José with the French prune, and quite generally planted and known as Gros prune. The tree is a strong grower and prolific bearer, the fruit growing large and fine, if properly thinned, and it is sometimes double. It has an acid flavor, light red color, and is in demand green for eastern shipment as a handsome plum. Pond's seedling plum is supposed to be its true name.

The Bulgarian prune is not generally grown, but is well spoken of by a few at Haywards, Alameda County, as bearing as well as the French, resembling the Italian but not quite as large.

The Silver prune was originated by a Mr. Alderman, of Dayton, Oregon, who believes it to be a seedling from Coe's Golden Drop plum, but a thriftier and hardier tree, and bearing larger fruit. The tree bears more on the body and the fruit does not break the tree down, and it ripens a week or two earlier. Many growers and nurserymen consider that it cannot be clearly distinguished from Coe's Golden Drop plum, which is a good plum for drying with the pit.

Prune Culture.

There seem to be no well established rules governing the planting and cultivation of the prune in California. It might be well, however, to state briefly what the most experienced horticulturists have been doing, and think essential to be done.

Prepare the soil by deep plowing and harrowing early in the winter, and set out trees one year old, about an inch deeper than in nursery, the scar of old stock to the north, and not less than twenty feet apart. Cut back the trees, after planting, to eighteen inches from the ground, and shade on south side by some convenient shade. Three or four buds should be allowed to grow at the top and the terminal buds of those below pinched back, after they have grown out a little, so that the buds will put out leaves and shade the stalk the first year. The second year remove them and cut back the limbs to a foot in length; the third, two feet, etc., the object in view being to shape a handsome tree with strength and bearing space, which can be attained only by low training and intelligent pruning.

After about six years of age, when in full bearing, the tree does not need cutting back as much as it does thinning out cross limbs, if any, and pruning out unfruitful wood. The sprags or small twigs in body of the French prune tree should be cut back to one or two fruit buds, so that the fruit may be large. Some, however, advise the removal of all such sprags, as the fruit on them is small at best.

It is important in pruning to select buds on the upper side of limbs, as they will have a greater weight-bearing power than buds forming branches from under side of boughs. Summer pruning is not advisable. A full season's growth, properly pruned back in the winter, and trained low, so that the branches take a natural upward and oblique direction, will shape a tree that will be strong and broad enough to live long and be fruitful.

There is a natural adaptation of tree to root; and it is generally believed that the apple should be budded upon the apple, the peach upon the peach, the pear upon the pear, and the plum upon the plum.

The plum root generally throws out suckers from the root, and ought not to be used in budding plums or prunes. The Myrobolan plum, however, does not sucker, and is much preferred as a root for the prune, especially in rich, damp, or heavy soils; while in dry, light, or sandy soil the peach root is found to be good for the prune, although some contend that the sap starts earlier and stronger in the peach root than the prune top is ready to assimilate, and becomes flooded and unhealthy.

In planting prune orchards, ascertain from those in your vicinity upon what root the prune does the best.

Method of Curing Prunes.

The French prune should be ripe enough to fall from the tree when shaken.

Dip the fruit into a boiling-hot mixture of one pound of concentrated lye in ten gallons of water, and let it remain long enough to scald the skins. Then dip in pure cold water, and put out on frames or boards to dry in the sun. After the fruit has been out ten days or two weeks it should be taken up and put in bins, to heat for a few weeks; then dipped in boiling-hot water two minutes, dried awhile, when it is ready for packing for the market. Do not dry prunes too much. They will keep without being dried to death. A common galvanized pail, made for the purpose, with three-eighths-inch holes on sides and bottom, makes the best dipper. A canvas cloth may be spread under the tree, so that, in shaking, the fruit may be gathered clean and unbruised. Some, however, shake and pick from the ground.

The French method of curing prunes is substantially as follows:

The fruit grower dries his fruit in an oven sufficiently to keep about two weeks without molding. The prunes are then sold to factories, where they are cured in this manner: After being graded by use of wire screens they are packed in long, hollow, metal tubes. After being filled a cap is screwed on them, to make them air-tight. These tubes are put in a steam drum, and live steam is turned on, and they are cooked for a longer or shorter time, according to the size of the fruit, at a temperature of one hundred and ten degrees. They are then ready to pack for the market. The peasants frequently cure or bake prunes in their bread ovens sufficiently for sale to the merchant, who grades and packs them. It is not certain that we need imitate the French method of baking the prune. We may produce even better results in our own way.

The California sun-dried prune is delicious when stewed, while the French, being already cooked in the process of curing, tastes well before stewing, but becomes rather insipid afterwards.

We can profitably imitate the French method of grading our prunes into at least three or four grades. After gathering the fruit, pass it over wire sieves, arranged on an inclined frame two or three feet wide, and eight or ten feet long. The fanning-mill movement is given to the frame by means of a wheel turned by hand. The largest prunes drop through the last and coarsest sieve, or pass over it entirely, if very large.

The French merchants separate their prunes into several grades; the first four, ranging from thirty to seventy to the pound, are kept for the European market. The fifth, or first grade for importation, about seventy to the pound, are sent to this country; also, grades of smaller fruit, with which we have to compete for a market, with four grades of prunes, ranging from forty to one hundred to the pound. Some rule of action should be adopted by prune growers and merchants in California in grading prunes.

Prunes of California.

Samples of green prunes preserved, and others dried, are submitted for your inspection; many orchardists have kindly favored me with specimens. They are believed to be true to their names; the difference in color and size is owing to the soil, rainfall, and temperature of the several localities where grown. There is no doubt that conditions in certain places are more favorable to the growth of the prune than in others. A critical examination and study of such conditions and the habits of the prune, in wood and fruit growth, would be of interest and importance at our next meeting.

Mr. Robert Williamson, of Sacramento, read an essay on the fig, as follows:

THE FIG, ITS CULTIVATION AND PREPARATION FOR MARKET IN CALIFORNIA.

In treating this subject, I shall not attempt a description of the methods of cultivation and preparation practiced by the people in the old countries, where figs are extensively raised. I deem this unnecessary, as Dr. Gustave Eisen, of Fresno, read a paper at your meeting in November last, at Los Angeles, in which he describes very ably, and very minutely, the methods practiced in the Mediterranean countries. I shall deal with the subject only in general terms, and endeavor to bring out only such facts as shall be of practical use to us in California. The fig is the most ancient fruit we cultivate; it has a history dating back farther than any other fruit we grow. Thousands and millions of people in all ages of the world, have subsisted largely on the fig.

In many of the old countries, the failure of a fig crop means not only stagnation in business, but almost starvation and famine. The late B. B. Redding told me, not long before his death, that while traveling in Europe, he learned that a very large per cent of the inhabitants of Asia Minor, Greece, Portugal, Italy, and many of those old countries, live mainly on the fig and olive; that travelers and shepherds, when starting off on trips with their stock or otherwise, would carry with them as their supplies of provisions, little else than dried figs and pickled olives; and that they would not only live for weeks and months on these, but grew fat, and endured almost untold hardships and exposures, enjoying the most robust health all the time. It is a well known fact that the fig possesses more nutriment and also more medical properties than any fruit we cultivate, excepting possibly the olive. It is a healthy and substantial article of food, either for man or beast, and is at the same time a fine, delicate flavored luxury, and can readily be brought into general use by almost the entire human family, when it is once brought to their notice and put within their reach. One of the chief barriers to their general use now by the American people is the high price at which a good article can be obtained.

Some idea of the magnitude of this industry in the old world may be gleaned from the fact that, according to the report of the American Consul, there had been delivered for export at Smyrna alone, for the year 1884, twenty-one million six hundred thousand pounds of dried figs, besides, possibly, as much more from Italy, Hungary, Dalmatia, and other fig producing countries, making a grand total export of fully forty million pounds, besides supplying an enormous home consumption. Of this large export, England, Germany, and the United States take the bulk of it. With these facts before us, and with the further fact that there is but a small portion of the earth's surface where the fig can be successfully grown and cured, and that we in California have the lion's share of that small area, are we not blind to our best interests if we do not improve our golden opportunities? It is a thoroughly demonstrated fact that the fig tree will grow most luxuriantly, thrive and bear great crops, on most all of our valley, plains, mesa, and foothill lands, from one end of the State to the other. The warm, dry alluvial soils, and dry, warm climates of the interior valleys and foothills, seem to be peculiarly adapted to its successful culture and curing. It will grow and bear good crops of fruit on lands too dry to mature other fruits. It will also do well on our rich, moist bottom lands, provided they are well drained. So that there is no fruit that can be more generally grown all over our State than the fig, and no other with so little care and risks, or that is more profitable in the end, if we get good varieties and handle the fruit properly. Preparation of the fruit for market, has, until very recently, been done in the most careless and slovenly manner by the California grower; so much so, that many have concluded fig growing in this State was a failure. Only a few years ago the same ideas prevailed relative to raisin and wine making in California. But what a change has come over the public mind relative to the two last named products, and the same change, and even greater, will soon come over the public mind in regard to raising and curing the fig.

The best method for curing the fig in the sun, is to pick it when it has just begun to wilt. Place it on trays in a tight room, put a slow sulphur fire under it (say half pound of best sulphur to two hundred pounds of figs); let the sulphur burn slowly till consumed, the fumes ascending among the fruit until entirely exhausted. This will require, say ten or twelve hours. The fruit should be kept in the sulphur bath. The object of this sulphuring of the green fruit is to prevent fermentation and souring in the process of drying, to preserve the natural flavor and the qualities of the fruit, to soften the skin, and at the same time to bleach or whiten the dried product. After the sulphuring it should be taken out, placed on trays or a scaffold, and treated much the same as we do the raisin. They should be turned over several times while drying. Care should be taken not to let them get too dry and hard. This, of all the mistakes, is the most common with the amateur in fruit drying. All that is wanted is to simply evaporate the water from the fruit. The softer and more flexible it is the better, and the more salable the product will be; and the heavier it weighs the more profitable it is to the producer, and the more palatable and satisfactory to the consumer. The operator should not wait until the whole batch is dry before taking it up, but should watch it carefully, and as fast as a portion of it is dry enough, to pick out and take up all such specimens as are sufficiently cured. The sense of feeling, aided by a little common sense, will tell him when it will do.

In most localities, especially in the valleys and near the coast, it will pay well to cover the figs at night to keep off dampness. With favorable weather and proper care it will usually take from four to seven days to dry the sulphured figs, and eight to twelve days to dry the unsulphured, for they dry much quicker after being sulphured. After they are thus dried, they should be dipped in a boiling-hot solution, composed of, say thirty gallons of water, one pound of concentrated lye, and three pounds of best rock salt, thoroughly dissolved. The figs should be held under this boiling water about two seconds, and then taken out, dripped or dried until the water is gone, and then packed away in large boxes about the same as used for raisins (covered up so as to keep out insects), and left to sweat from two to four weeks before packing for market. The object of the dipping is to kill all insect eggs and soften the skin. This is done by the alkali, while the salt preserves the fruit and materially adds to the flavor of it by destroying that flat, greenish taste which is perceptible in the fresh dried fruit. It also assists the granulation and crystallization of the natural sugar in the fig, and assists in bringing out a white, floury bloom, which adds much to the appearance of the product. It also repels the attack of insects.

So much for the sun-drying process. But I think the enterprising Californian, the intelligent grower, will not much longer waste his precious time with old-time methods, but will find a much speedier and more perfect way to complete success by employing artificial heat. From recent experiments made I am thoroughly convinced that the employment of artificial heat in curing the fig is the dawning of a new and grand era in that great and growing industry in this Golden State. I think in that, as in many other things, we will find ourselves centuries ahead of our antediluvian brethren in the old countries. I do not think I am over sanguine. I hope, nay, gentlemen, I expect (if I live five years longer) to see my predictions fulfilled regarding the disuse of the old and the adoption of the new system. I think the samples before us to-day a sufficient guarantee for my prediction. The samples I exhibit here to-day are the Pacific White and the San Pedro, commonly called the White Smyrna. It is a great bearer, very productive. The fruit is very large, especially the first crop; is very sweet and finely flavored, but like many other white figs, it will crack or open at the calyx or eye, so as to admit ants and other insects, and therefore ferment and sour in the process of drying if allowed to hang on the tree until fully ripe, or till wilted. It will even sour on the tree; especially is this the case if grown on quite moist land or irrigated. This habit makes it next to impossible to dry in the sun this delicious and prolific fig. But the samples before us demonstrate that it cannot only be dried by artificial heat, but it makes a most beautiful and delicious product. I think it is hard to equal, and impossible to surpass it. I dried these samples during the State Fair, in the Acme Steam Heat Evaporator, exhibited by Messrs. Bachelder & Wylie, of No. 27 Market Street, San Francisco. I do not know whether the ordinary dry hot-air evaporators would produce the same results or not, but I do know that the steam drier was a great success in this case. The best sample was dried in nine hours, at a temperature of one hundred and thirty degrees, the other at one hundred and twenty. I was afraid of burning the fruit, and had some run five, six, seven, eight, and ten hours at one hundred to one hundred and ten, but most of them molded and spoiled, but I do not believe that any dried above seven hours at one hundred and ten degrees would have spoiled had I not put them away in tight paper boxes. Being away from home, they were not opened or examined for two weeks. I think if they had been kept open and aired for a time, that even those would have kept. These on exhibition stood the severer test. I only cured three varieties, the two on exhibition and the large purple, or common California black. I ordered and had sent two lots of the Verdoni, or White Adriatic. I was very anxious to test them, but they both arrived so spoiled that I could do nothing with them. While, of course, there are some varieties much better than others, I am satisfied that by this process we can dry and make a fair merchantable product out of almost any of the varieties we have, and thus turn to profit what has usually been considered of no value.

As to varieties, we are still at sea as to whether we have the best or not. Many efforts have been made to get the best varieties, the true fig of commerce as we are accustomed to call them, just as if there was only one variety cultivated in Europe. The facts are, they cultivate there many kinds; different localities grow different figs, but I presume, of course, that in each locality there is some one variety that takes the lead and is cultivated almost exclusively. The largest quantities and finest figs generally come from Smyrna, and those that we receive have the appearance of being all of one variety. Many efforts have been made to get that particular kind, but we have generally supposed that we had failed. That supposed failure may be due to climatic conditions, or the manner of treatment in the process of curing, or possibly both. Our figs usually have much thicker, tougher skins when dry than the imported article. I think that is certainly due both to climate and treatment. Our dry climate has the effect on all fruits of toughening or hardening the skin, and this is what causes our fruit to ship better and keep longer that the same fruits grown in countries where they have rains during the growing season. Every fruit shipper knows that after the first fall rains it is unsafe, in fact useless, to attempt to ship fruit that has been exposed to heavy rains.

Some five or six years ago the "San Francisco Bulletin Company," assisted by some others, imported quite a large number of fig trees and cuttings direct from Smyrna. I think they took the precaution to send a trustworthy man to attend to it personally. The cuttings and plants came, and were distributed quite thoroughly over the State, to be tested in different localities. I got some of them, and have them growing, but with me the fruit has not matured. It blasts and falls off before it is half grown; and this has been the case with all I have heard from, with one single exception, and that was near Penryn, in Placer County, where H. E. Parker has a four-year old tree that I sold him out of my lot. It matured several specimens this season. Mr. Parker said they were a very fine flavored thin skinned fig. I only saw one specimen, and it was (I suppose) not a fair sample. It looked and tasted much like the San Pedro. I think if this fig ever succeeds it will have to be fertilized by some other variety, though it would seem from the success of Mr. Parker's tree that they may mature fruit on the granite soil of our foothills. There is certainly no soil or climate in the State where the fig does better than in these foothills at an altitude of from five hundred to one thousand five hundred feet above the sea level. In the foothills of Shasta County, between Ball's Ferry and Shingletown, there is a fig tree about twenty-five years old that measures one hundred and three inches in circumference three feet above ground, and the branches, or top, cover an area equal to sixty-five feet in diameter, and its yield of green fruit is variously estimated at from one thousand eight hundred to two thousand five hundred pounds annually. There is also a lot of trees owned by Mr. Wildermuth, near Valley Springs, in Calaveras County, said to be equally large and productive, and I have seen in many other places on the granite soil enormously large trees of the large purple variety. I have frequently been told of trees yielding from six hundred to one thousand pounds of dried figs. I have a small orchard of fig trees at Penryn, only seven years old from the cutting, that yielded one hundred and fifty pounds of dried figs to the tree this season; that, at 6 cents per pound, would be $9 to the tree. I expect that yield to be increased at least 20 per cent per annum for the next ten years, and when my figs are properly cured (by artificial heat) I expect to get 10 to 15 cents per pound instead of 6, as now. Thus it will be seen that a fig orchard, properly managed, will prove a bonanza.

But to return to varieties. I would recommend, for drying in the sun, the Pacific White, White Ischia, Large Purple (or California Black). The White Adriatic is also represented as drying well, though I have not tried it. But when artificial heat is to be used, I think that no other fig, certainly none that I am familiar with, will equal the San Pedro, both as to quality and quantity, except, possibly, the Virdoni or White Adriatic may equal it. But, as before stated, I have not tested it. It is recommended very highly by others who have tested it. There are several other varieties which we cultivate that might be mentioned, but I believe it is a great mistake for an orchardist to plant, in a market orchard, a long list of kinds. Plant only a few leading kinds known to be good, and leave experimenting and testing to the nurseryman, whose business, unfortunately, it is to do the experimenting. Ever since I have been in the nursery business I have been constantly, and still am, experimenting. There is never a season that I do not have a long list of kinds on the test roll, and hundreds of them prove utterly worthless here, though many of them come highly recommended from the East and Europe. Hence, I repeat, plant but a few varieties, those only that are known to be good.

Planting and Caring for a Fig Orchard.

The fig is a long lived and strong growing tree, and the trees should be planted farther apart than most other fruit trees, especially the stronger growing kinds, such as the Large Purple, Pacific White, and White Adriatic. The San Pedro and White Ischia are not strong growers, and consequently might be planted closer, but even they want plenty of room. I would recommend planting fig trees from twenty-six to thirty-two feet apart. Then fill in with grapevines, berries, or some other fruit trees, such as peaches, plums, prunes, or quinces, something that can be taken out at the end of ten or twelve years, or so soon as the fig trees need all the room. Thus a quick and constant return can be realized from all the land. The fig and grape do well together, and I should prefer filling it with grapes to anything else. If the land is well adapted to grape growing, the vines can remain in the fig orchard fully as long, if not longer, than most anything else; but I would not plant them too close to the tree. Then, in thinning out, take out those nearest the trees first; they need not all be taken out at once.

Pruning the Trees.

Most all trees do best if cut back heavily when planted, but the fig is an exception to that rule. It does not need to be cut back much, though it should be shortened in some. It often has a mass of fine fibrous, moss like roots. These should be trimmed off, leaving only the large and medium sized ones. All the bruised or mutilated roots should be pared off also; then, if carefully planted, it will grow. It does seem strange to advise the removing of the fine fibrous roots, but experience has demonstrated that they do best deprived of these roots. After the tree is established in the orchard it needs but little pruning, except to give it shape, until it gets to that age when it is growing but little and making but little new wood; then it is a good idea to head it back quite heavily. This renews the tree and causes it to throw out a large amount of new wood that will bear large crops of fine fruit. I had occasion three years ago to head back an old tree quite heavily. It threw out the first year a large number of new shoots two to three feet long, and they were literally loaded with much finer fruit than the other trees that were not so headed back, and it has continued ever since to bear much larger crops and finer fruit than any of the other trees that were not cut back, and they all had equal advantages otherwise.

Packing the Fruit for Market.

I think this part of the work should be done by the dealer, who is supposed to be prepared for it. In that case, the farmer could take it out of his sweat boxes and market it in clean cotton sacks, though he can, if he pleases, put it in suitable packages for market himself. The most convenient package for the trade, in this country, is a neat, strong sugar pine box made on purpose for figs. It is intended to hold twenty pounds, but the figs must be pressed in pretty solid to get in the twenty pounds. The box is made very strong in order to stand the heavy pressure. It is also made very tight to make it impossible for insects to get into the fruit. Figs thus packed will keep good for years, and these packages are a convenient size also, for the merchant to retail from. The figs should be flattened out and laid in nice, neat tiers at both top and bottom of the box, and also placed with some care and regularity all through the boxes. If thus placed, and then properly pressed, it will add much to the appearance of the fruit, and the price secured will well repay for the trouble. Sometimes boxes are made to hold only ten pounds and others to hold thirty, forty, and sixty; but the twenty-pound boxes are the most convenient. Mr. Burnham, of Riverside, puts most of his crop into small, round hoop boxes, holding a half to two pounds each. He says it pays him to do it. He tells me that he got for his figs last season (put up in that shape), from 16 to 24 cents per pound, and for some in half pound boxes he got 27 cents per pound. As this industry progresses and develops, a system of uniform packing will be established. Public attention is being turned to the subject, and I think it is destined to develop very rapidly, and that in the near future it will be one of the most prominent and best paying productive industries on this coast.

Mr. Shinn: I want to say one word in relation to the fig spoken of in the paper, called the Bulletin fig. Many gentlemen received cuttings from that fig, which come from Smyrna to the Bulletin Company, and have planted it, and many, like myself, have been disappointed, because they have no fruit as yet, the figs dropping prematurely. I only want to say, in reference to that, to encourage those, that the Bulletin Company, through Mr. Ricksford, its manager, has been in correspondence with Smyrna parties, who sent them out, and I saw a letter recently that had been received from Smyrna, not to be discouraged about the bearing of that fig, that it would not come into bearing under seven or eight years. There have been grave doubts whether that is the true Smyrna fig, but time will show; and I will say, further, that I had a visit from the Consul at my place, and he said that there was every reason to think that they were the true Smyrna. He said that it grows back from the Mediterranean some twelve miles, and he was obliged to send men to pack on their backs almost all the cuttings to the coast, but he sent trustworthy men to do it, and he believes it is all right.

Mr. Williams: I listened with a great deal of interest to the essay which has just been read, and I have had a little experience with fig culture and drying, and I am fearful that there are some very serious errors in that essay in regard to drying, as to sulphuring figs for twelve hours. I do not believe you will ever get rid of that sulphur taste and smell. However, as to drying figs in artificial driers, I am not prepared to say. I examined the sample that Mr. Williamson has and it seems to me that he dries too much. I think that is one of the fatal errors in drying figs—drying it too hard and making the skin leathery. I have some samples of the White Adriatic, and I would like the convention to sample them. I have dried them in the sun and sulphured them only ten minutes, and was fearful then I had too much, but the fumes have passed away, leaving it in a very pliable and nice condition. The White Adriatic is a very thin skinned fig and very tender. I find my greatest trouble is putting them under my screw press that I have—that I bruise the figs in bringing them down to the proper shape. I would like to ask Mr. Williamson where he got the word "virdon."

Mr. Williamson: I got the word "virdon" from a gentleman who was as well posted as Mr. W. B. West, of Stockton.

Mr. Williams: The true name is "Susateca." It is not a Spanish fig, it is a Turkish fig. My faith is so strong in this fig, that I have planted twenty-seven acres. And I propose to put sixty more in, and I will either have a fig orchard or I will not have anything, and be a "busted" man. Now, of course, my drying is all experimental. The first that I dried I was afraid to sulphur them. I dried some and sent them on to my agents, and they complained that they were too dark—they were much darker than these. The next I put the sulphur to very lightly, and I cannot perceive any taste of it, and I think if Mr. Williamson will deal more carefully in his sulphur, that he will make a much better fig.

Mr. E. Booth: I sun-dried this season about eight tons of the fig, but I do not sulphur at all, and sold every one. They were dried in the foothills, about twenty miles from here, in Placer County, a short distance from Lodi. I do not sulphur at all, and have some really fine fruit.

Mr. Williamson: I hope this audience did not understand that I would recommend a continual sulphur fire under the figs for eight hours. The paper says, put the figs in a tight room, and a small amount of sulphur, a half pound to two hundred pounds of figs; burn the sulphur slowly, and let the fumes escape into the room, and keep the fruit in that room for eight or ten hours. I didn't keep the fruit this way, but got the information from parties who had experience. The best dried figs I ever saw in the State anywhere, were dried by Mr. Burnham, at Riverside, and he treats them that way, and his figs do not taste of the sulphur. He dries them in the sun.

Mr. Gray: I dried a good many figs by artificial heat, and I think the only thing to guard against is too much heat; they have got to be dried, as you do a raisin, with slow heat and plenty of it. I would agree with Mr. Williams in regard to too much sulphur. We all know that would be fatal, and what advantage would be gained in letting them stand in a room, where there had been sulphur a long time, and the fumes had spread over the fruit, and then to disappear. I do not see that anything would be gained, or anything lost, except the time occupied in drying. About this Bulletin fig, General Bidwell has a number of figs; they set full of fruit every year, become half size, perhaps, and then drop off. I tried to graft some of them last year, but didn't succeed. I thought by grafting another kind into the trees, that they might fertilize. I would like to ask if any one has had any experience in top grafting the fig tree, and what their opinion is about their fertilizing.

Mr. Booth: I have something like eight hundred fig trees on my place, from ten to fourteen years old. I have none of the kind these gentlemen speak of; and I tried grafting, and could not succeed. I tried ring grafting, and a number of grafts on the top, but never succeeded. The only way I did succeed was to take and cut them down to the ground, and graft them at the roots, and that way I succeeded in making them grow.

Mr. Shinn: Mr. Silva, of Newcastle, informs me that one of his neighbors has fruited the Bulletin fig this year; and the fig was a delicious one to eat out of hand, or dried in the sun, something like the San Pedro. That somewhat corroborates the idea that we had all along entertained—that it may prove the right fig.

Mr. Kells: In regard to grafting the fig, I have had a little experience. Last year we had a fig, three or four years old, that had made very little progress; and I had a White Adriatic fig, and I thought I would put cuttings into a tree; and I put in six grafts, and all grew, except one; and they made a growth—the longest one of five feet this year; and I think, so far as grafting on a young tree, it is surely a success. In my experience I used a cleft graft.

Dr. Kimball: In the convention at Los Angeles, last year, in Mr. Eisen's paper it was stated that caprification was necessary; that it had been practiced all through the East for untold ages, and that it was a problem that Californians had not yet solved. In order to throw a little light on that question I have a clipping from a newspaper that I would like to read. It is this:

FACTS ABOUT THE FIG.

The practice of caprification, still prevailing in most of the countries where the fig is grown, is of remote antiquity. Some of the oldest Latin and Greek authors mention or describe it. Caprification consists in placing or suspending branches of the wild fig tree over trees of the cultivated varieties. An insect inhabits the fruit of the wild fig, and leaves it to enter the fruit of the cultivated tree. This is a well ascertained fact. It has been believed that the action of the insect promoted or hastened fertilization of the cultivated fruit, and prevented the falling of the fruit from the tree before ripening. In Italy certain varieties of the fig are supposed to need caprification, and others to be able to dispense with it. A score of years or more ago, the Royal Society of Naples commissioned a distinguished botanist to investigate the subject of caprification, doubts having arisen as to the value of the practice. He began by casting all theory aside, and proceeded at once to experiment. After years of observation and research, he made an elaborate report of his investigations. A portion of his paper was translated into English, and is published in the "Journal of the Horticultural Society," of London. His verdict was that caprification is not only unnecessary, but positively injurious, and he recommended the abandonment of the practice. The report makes one of the most interesting chapters in all the history of botany. He shows that the fig is self fertilizing, and that the theory of "male and female" fig trees is a myth. Nothing is needed for the complete success of fig culture in California but to obtain the proper varieties. The many failures to produce a first class dried white fig, comparable to the Smyrna product, have not been due to any fault of the California soil or climate, but to the inferiority of the varieties heretofore planted. The climate of the interior valleys and hills of California is far better suited to fig culture than that of the famous Valley of the Meander, whence come the "Smyrna figs." Killing frosts visit the Meander Basin, destroying fig trees as well as the crop of fruit. The fig crop is never affected by frost in California.

I only present this as being a source of some little information, as it seems to come from a highly authenticated source.

Mr. Milton Thomas: Near Los Angeles, where I live, Messrs. Barnard & Benedict have what they call a crystallizing process, and they couldn't get sufficient figs for the demand. They wanted two hundred tons. All the figs they crystallized, one house wanted to take. They sent specimens all over the different cities and towns, and orders came in so fast they couldn't fill them. They could, perhaps, have sold one thousand tons if they had them. Some time ago the Los Angeles County Pomological Society appointed a committee (I was one of them) on the nomenclature of the fig. The committee went around and obtained all the different varieties. A man named Hutton, who had a good deal of experience with the fig, had some specimens to show. His process was dipping his figs into hot syrups a short time, and then putting them out and let them dry four or five days, and I assure you that they made a very fine fig. He has another process that he didn't tell, and wasn't inclined to tell, which he claimed was something new, and something good, and he expected to make money out of it. I think the people who plant figs will have a good chance. It is not even in its infancy here, because it has scarcely been started. I think the time will come when fig culture will be one of the most important industries of the State.

Mr. Williams: As crystallizing has been referred to, I will state that Messrs. Barnard & Benedict sent me an order for one hundred tons of the White Adriatic. I told them there was not that much in the United States, but if they would wait a couple of years, I would furnish them. He offered $50 per ton, free on board the cars, for the green figs.

Mr. Maslin: The subject of caprification is something of consequence to the people of this State, and especially as the "Chronicle," on at least three occasions, has devoted an editorial to the question, insisting that caprification is necessary to fertilize the "Bulletin" Smyrna fig. Of course, I suppose, that every one interested in fruit culture has read those articles. I have met a number of them, and some seemed to doubt whether the white Smyrna fig imported by the "Bulletin" will ever mature. All that is written upon that subject you can find in the "Cyclopedia Britannica" in the account of caprification; that as the Smyrna fig approaches maturity in Smyrna, the peasants take the branches of the wild fig and hang in trees of the double figs, for this reason, that out of the wild fig, the Capri fig as it is called, proceeds an insect, which the peasants say, entering into the double fig, fertilizes it, and produces an inflammation which increases the size of the fruit, as we all know the codlin moth makes a larger apple. It is one of those astonishing things that after awhile run and run and people will believe it without taking the scientific pains to ascertain whether it is true or not. In 1846, the Royal Academy of Agriculture of Naples, appointed Mr. Gasparina, an Italian, to investigate that question; he proceeded in a scientific manner to investigate the subject. His report is translated and published in the third volume of the Horticultural Society of London. It is one of the most interesting articles that I ever read. He proceeded to test the question on the Adriatic fig in Italy at the same time he did the Smyrna. He took his trees and covered them so that no insect could get into them. A sufficient distance apart he introduced the Capri fig. He was engaged in this investigation for about six years, and left no stone unturned, and made a statement of the conditions, as, for instance, the Guca fig, which he covered, and prevented the incursion of the insect. Out of one thousand figs, we will say he found four hundred on the ground, and six hundred matured on the tree; and of those trees into which the Capri insect had made its incursion, perhaps six hundred and seven had fallen to the ground. It was not alone one experiment, but as I say, he proceeded for five years, and he then came to the conclusion, which was inevitable, that the incursion of this insect, instead of producing good, really was an element of harm; that the trees which were caprified lost more of their fruit than those which were protected from the insect. He also showed that the Capri fig was not of the same type as the double fig, and therefore, if they took any pollen at all, if there was a pollen in the Capri fig, that it was of such a character as to be unfertilizing to the pistils of the tame fig. He showed through his experiments that the fig was self-fertilizing, and didn't need any other fig to fertilize it; that the calyx was closed at the time the stamen and the pistil united in vegetable copulation. I only rise to make these remarks as I read the article and am engaged in the cultivation of the fig, because somebody seems to have the Capri fever, as the "Chronicle" devoted editorials to it, and the effect would be that as there was six thousand trees imported by the "Bulletin" some years ago, and cuttings taken from them, that those who have those trees might cut them down and give up in despair. I am engaged in raising seedlings from the fig; they are growing, and I do not know whether I shall ever receive the benefit of it, but some day I or my children will have the genuine Smyrna fig.

Mr. Williamson: I would like to ask Mr. Williams whether his figs are in the natural state when he dries them.

Mr. Williams: I dipped them in salt water. I didn't go to the sea to get it, but I got rock salt and dissolved it, and dipped them in, and then subjected them to a very mild sulphur bath, and put them out upon trays, and dried them in the sun, and turned them over every day, but didn't dry them too much. I think that the better plan is to about half dry them, and put them in sweat boxes, and nature will do the balance.

Mr. Williamson: Did you dip them in any sweet solution?

Mr. Williams: No, sir.

The Secretary read the following letter:

West Berkeley, November 16, 1886.

To the President and Members of the Fruit Growers' Convention, Sacramento:

Gentlemen: The writer on California fruit shipping to the East, Mr. Weinstock, is perfectly right regarding the three points that he thinks it is necessary for the success of California fruit at the East, namely: low freight, quick railroad time, and regulated distribution of our fruit throughout the East; but, if he would add a fourth point, which I do consider to be one of the most essential, that is, to find the means where fruit can be kept in perfect condition for, at least, from ten to twenty days. Not only that would make a full success of his suggestions, but also, would bring down the rate of the freight immensely, and supply each and every eastern market, quantity, equal to the consumption required. I am not advocating the fourth point because I am the inventor of a process of keeping fruit in perfect condition, in its natural state, for a long time; but there are many others, perhaps, equally as good, which could be adopted, if mine is not wanted.

What can you do if you encounter a spell of warm weather, once or twice a week, while the fruit is in transit? Surely, you cannot save the fruit and repair the loss by quick transit, low freight, or auction sales. Fruit will spoil, and that is the end of it. I repeat, that the fourth point, that I said is the most essential of all the rest, and I agree with Mr. Weinstock, that in the California State Convention of Fruit Growers, the discussion ought to be general.

From last year until lately, I had decided to keep my "air purifier preserving room system" to myself and secret, by treating the fruit for fruit growers and shippers at the rate of 1 cent per pound, as you can see by my circulars which I sent to nearly all the fruit growers. Since then, I have made other improvements, which reduce the cost of treatment immensely.

Furthermore, that every large orchard or section of fruit growers, cities or counties, can have one built in their place, and I will show them how to work it, so that they can handle their own fruit by themselves.

For further particulars, if it is desired, I would come to the convention and explain.

Respectfully,

I. ALLEGRETTI.

Mr. Frank Buck: I would like to hear from Mr. Allegretti as to the two carloads he took East, and an explanation of how they carried, and the result of the experiment.

Mr. Allegretti: I have just returned from the East, where I took two carloads of fruit with me; and I found out a great many things, as Mr. Weinstock has explained in his letter to the "Rural Press." I took East three hundred boxes of peaches, that I bought from Mr. A. T. Hatch, at Suisun—a fine peach—and one hundred boxes of Bartlett pears, also from Mr. Hatch, and I had some prunes, which I had kept for nearly a month and a half in my process at West Berkeley. I had four or five varieties of grapes—Rose of Peru, Muscat, Tokay, and Black Hamburg. Mr. Block furnished me the Black Hamburg. He wrote me that he didn't think I could take the Black Hamburg to New York, as that is a tender grape. I stayed eight days on the way, and arrived in New York with the fruit in perfect condition, as can be testified by hundreds of people there. A gentleman named Martin was on the train with me, and he examined the fruit at Chicago, and the fruit was in perfect condition, with the exception of a few in the box of Muscat and Tokay grapes, that I bought from Mr. Bassford; and I lost many on the first fourteen hundred boxes that he sent me in transit from Vacaville to West Berkeley, in twenty-four hours. I only took a few hundred boxes, and not the fourteen hundred boxes. Those few hundred boxes didn't go in perfect condition, but were a little molded; but the four hundred boxes that Mr. Block sent me from Santa Clara—Muscat, Tokay, and Black Hamburg—went in perfect condition. As the market was very low I sold at $2 and $2 25 for a twenty-pound box. The peaches I sold for $3 a box, for I had not so much competition as I had in the grapes. I found a good deal of work going on there against the interests of the fruit growers. The different agents that were selling would put down the price, and so I had to sell at a low price myself; but the fruit went in perfect condition. That is the result of the trip. Here is one gentleman that saw the fruit after I had treated it five days. Mr. Wilcox asked me to treat some strawberries, and he can testify. Mr. A. T. Hatch has seen a good deal of the fruit, and he can state the way they were keeping. I have kept the Black Tartarian cherry that W. W. Smith, of Vacaville, sent to me, for fifteen or twenty days; and I sent the same box he sent to me back to him at Vacaville; and he found the fruit all right. I have kept the fruit as long as three months and ten days—that is, the Black Tartarian cherry; also, the Centennial and the Royal Anne. A couple of boxes came from Oregon, partly spoiled, and I picked and kept nearly one box. The question of the keeping of the fruit I leave to any one of you gentlemen that want to test it. I had Winter Nelis pears in as full and perfect condition as when they were picked from the tree. I am greatly interested in the fruit growing business; and if you can keep the fruit for fifteen or twenty days you could do away with the enormous freight; and if you could keep back the fruit, you can delay the shipment and feed the market as it is necessary. Thus the problem of your fruit shipment is solved absolutely. Senator Stanford wrote me before he went to Washington, when I sent a basket of fruit to him: "If you can preserve the fruit as I see, you have solved one of the most difficult problems of fruit culture in California." I have got the way to take your fruit in proper condition to the eastern market; send your fruit there in good condition, sell it at a fair price—at a living price—and you can sell not one, but twelve or eighteen carloads a day in New York alone.

Mr. Tompkins: What terms does Mr. Allegretti offer to the orchardists?

Mr. Allegretti: Last year I was not prepared to divulge this thing and allowed nobody to know what was my process. Since then I have protected myself by patent rights, and now I am prepared to show what it is, and I will explain in a few words this process. The process consists only in *paralyzing the germ* of the fruit—nothing else—if I take the fruit mature, because the fruit must be picked mature if you want something good to eat. If you pick it green it is no use. Now you are obliged to pick it green, because you have no other way to send it. I paralyze the germ of decay; that is what stops the growth of decay, and it remains sound as soon as I put on my process. That process has to be strong enough to get it right to the center of the pear or apple, or anything, and when the fruit does come to that point of paralyzation it will stand, not only one week, but ten weeks; no matter what kind of fruit. The strawberry is the most delicate, and I will keep it for you one month, which is more than sufficient to carry the fruit to Europe. Before last year the process cost about three fourths of a cent; now it will cost only a fraction of a cent per pound. The question is asked, how I propose to sell my process to you, gentlemen, and give the patent rights to you. Let an orchard or three or four orchards combine together in one city or section, or county. I will show you what you have to do, and you will have a thing that will last for twenty years, and all the great expense you have is to build a house. I don't ask anything else, no royalty or nothing; but it costs money. It is no expensive process. I will build a room and you can ship your own fruit and prepare your own fruit, and I will sell you the secret. I am building a room in the Palace Hotel, about thirty-five feet long, but that is not for fruit; it is for meat, but it is applicable to vegetables or anything else. A room, say from ten to twenty tons, would cost you, gentlemen, about $1 to the cubic foot of outside measure.

MR. TOMPKINS: That would be for a room twenty feet long, ten feet high, and ten feet wide, about $2,000.

MR. ALLEGRETTI: Yes, sir.

MR. TOMPKINS: Then, if I have the measure of a car right, it is about eighteen feet long and six feet wide and six feet high.

MR. ALLEGRETTI: That is ten tons, but you have to have more room. You have got to use something, so that you want a room outside of that for ice and other articles. It is a process going on which takes some room.

A DELEGATE: In this process, is there the slightest deterioration in the flavor of the fruit?

MR. ALLEGRETTI: No, sir; it goes in its original condition, in the natural state. Any one can answer that, that sees my fruit—that it keeps the flavor, the color, and the texture just the same as when it was picked from the tree. I suppose some of you gentlemen have seen, in the citrus fair, in San Francisco, that I had some fruit there. I had seven or eight different kinds of grapes on exhibition there, and some Winter Nelis pears, and some Pearmains.

MR. BLACKWOOD: Does your process injuriously affect the fruit as to health?

MR. ALLEGRETTI: No, sir. Professor Hilgard, I gave him the fruit three or four times to analyze it. There can be nothing injurious, because there is nothing but cold air purified. I add nothing to the fruit, but take the box of fruit just as you pick it, and I put it there and keep it that way. Nothing else.

MR. TOMPKINS: According to my figuring a car will take six hundred and forty-eight cubic feet. Would one hundred cubic feet be enough for waste room?

MR. ALLEGRETTI: No; you are to calculate about one third.

MR. TOMPKINS: That would make the cost for one car about $900.

MR. ALLEGRETTI: No, sir; I am not talking about building a car. I am talking about building a house for any of you to operate this in. If it is as small as that I might charge $20.

Mr. Blackwood: How many hours or days does it take to prepare the fruit?

Mr. Allegretti: The house is always prepared, and working all the time. A small quantity is twenty-four hours; a larger quantity from twenty-four hours to five days. If you want to put inside fifty tons it will take at least five days.

Mr. Williams: Suppose the fruit is bruised and commenced fermentation, will your process stop that?

Mr. Allegretti: Yes, it will stop that; but you don't want to take fruit in there that is decayed. If you do it will come out decayed.

Mr. Wilcox: Mr. Allegretti just answered what I intended to explain myself. After visiting his place I came to the conclusion that the whole secret of his process was that he arrested decomposition. I saw pears that were bruised indirectly by the stems as they were packed, and these pears came out three or four weeks afterwards just as they were put in. The whole secret is that he congeals or deadens it—that is he arrests decomposition. I believe Professor Hilgard analyzed the paring of the pear and pronounced that there was nothing deleterious to be found in it.

Here recess was taken until two o'clock.

AFTERNOON SESSION.

The Chair announced the following committee to wait on the railroad company, to secure greater facilities and better terms: H. Weinstock, of Sacramento; L. W. Buck, of Vacaville; C. W. Butler, of Placer County; I. N. Wilcox, of Santa Clara County; Judge Stabler, of Sutter County; W. M. Williams, of Fresno; C. W. Reed, of Reed & Co., Sacramento; Eugene J. Gregory, of Gregory, Barnes & Co., Sacramento; J. Z. Anderson, of San José; P. E. Platt, of Strong & Co., Sacramento.

The Chair announced the topic for the afternoon, the special order, the consideration of the resolutions offered by Mr. Weinstock on yesterday afternoon.

The Secretary read the first section, as follows:

> That an association be formed, to be known as the California Fruit Union, and that all persons raising or shipping fruit for eastern markets, be eligible to membership.

Mr. Weinstock: I would explain the object of offering the resolution in that form. The observations that I made while East, made it very clear to me that we can never hope to secure the market prices for our fruits unless we have a unity of action; unless there is a concert of action at this end among all who have fruit to ship, and in the East, too. I think we all realize to-day that the management of the fruit union last season made a great mistake in barring out the shippers, and that it would be very much to our interest to have the shippers work with us rather than against us. It is to our interest as growers to have buyers at this end, as well as buyers at the other end of the line. I think it must be perfectly plain to us all that no organization can hope to control all the fruit of this vast territory on consignment. While there are many growers who are prepared to ship their fruits on East, and stand all the risk, and wait an indefinite period for their returns, there are many others who would prefer to sell at a fixed price, and allow some one else to take the risks, and it is to these growers that the shippers are an especial benefit. For that reason shippers should not be discouraged and driven out, but rather encouraged. It is to our interest that they shall profit and benefit by such shipping facilities, as we, by our influence and position may be enabled to secure. It is to the interest of the shippers, on the other hand, to unite with us, because a unity of action is as much to his advantage as it is to ours. As the conditions are to-day, a shipper with the experience of a lifetime, who may be possessed of all human wisdom, and all human foresight and aftersight that it is possible for a man to have, has no assurance when he is sending out a carload of fruits for which he has paid ready money, that it is not going into an overloaded market, that it is not going into a market where five or six carloads have preceded him within twenty-four hours, or where five or six carloads will follow on his heels. Therefore it is as much to his interest as ours that there shall be a unity of action, and I know of no other way that there shall be such unity of action, than to admit the shipper into an organization that is now composed strictly of growers.

Mr. Hatch: What Mr. Weinstock says in regard to this is just as true now as it was a year ago, when an endeavor was made to get a unity of action, and I am glad to know that there are some here that think that this is necessary, and I think soon all will agree. When this is accomplished we will have better success, and not till then. This unity of action can only be brought about among any set of men, in any business of any kind, by some binding contract. The Orange Union of Southern California, they have a contract, each man with the other. In Florida they have such contracts in a like organization. Now, if we would succeed in uniting, and we must unite to succeed, we must have some contract which each one must sign, and without it it will never hold.

Mr. Rutter: As there are some shipping representatives here, probably the convention would like to hear from Strong & Co., or Lyon, Curtis & Co., and get their views on the subject.

Mr. P. E. Platt, of Sacramento: While it is true that I am to a certain extent a grower—for I am a fruit grower as well as a fruit shipper—yet the predominant business that I follow is that of fruit shipping, as one of the firm of Strong & Co. We have sent a good many fruit shipments to the eastern market during the last fifteen years, or more. I have been connected with the firm some thirteen years, and during that time they have shipped a great many carloads of fruit, and to all the eastern markets that would take the fruit. It is clear to everybody that the present methods are not altogether satisfactory or successful. I have not heard of any fruit growers who have shipped their own fruit this year, although there may be such, who are thoroughly satisfied with the result, and I do not believe that the fruit shippers themselves are going to brag very much about what they have done; but we have done this: We have demonstrated that train loads of fruit can be sent out of the country, and in that means a low rate of freight can be secured; we have demonstrated that there is an immense amount of fruit in the country to be moved. That is apparent to everybody, and, as Senator Buck said yesterday, there is going to be a great deal more the coming year, and some better method has got to be devised than scattering it.

Thus, I hold that fruit growing and fruit shipping are two parts of the same business, and that a fruit shipper has got as much right to ply his vocation, as long as he does it in an honorable way, as my friend Mr. Hatch has to raise fruit on a gigantic scale, as he has done. In other words, the fruit grower has got all he can do to grow fruit properly—to grow fruit for market, and to do so in such a shape that it will be of the right quality for shipping; and then there is a very distinctive and important place for the fruit shipper, and it is for him to deal with the freight monopoly in the proper manner; to handle the fruit, send it East, or dispose of it as may be best. Now, there ought to be, it seems to me, no conflict between these two great interests; as I said before, they are both part and parcel of the same general business. The fruit grower's work is not complete until he gets his money for the crop, and he is not going to get the money for the crop, under the present system, provided he is doing one thing, his neighbor is doing something else, and the shipper is doing something else, for then, the result is disastrous to everybody. The ground I take, is a little different from that presented by Mr. Weinstock. It is this: I think that the laws of business that regulate and control all these enterprises—all business—must and eventually will be applied to the fruit industry. You cannot regulate this business by legislation, by discussion, by adopting resolutions; and you cannot do it by fruit unions, in my opinion, unless they are on a different basis from what we have had so far. Other articles of merchandise are subjected to regular laws of trade, of supply and demand, and transportation. In my opinion, the main and only question that needs to be touched, and which, if properly handled will solve itself, is the question of transportation. Now, let me call your attention to a fact or two which no one will deny. I speak in a general way, and will not give the exact figures, because I have none in my possession at present. Four years ago, in Los Angeles, and in that part of the State, oranges were a drug in the market: they were shipped to San Francisco in large quantities, and were sold there at 50 cents to $1 a box. My own firm handled many thousand boxes, and we thought we were doing pretty well if we got $1 to $1 25 a box. Take the freight and incidental charges out of that, and the fruit grower got but a very small sum for his fruit, if, indeed, it paid him to pick it from the trees. The result was, that at that time everything was depressed. Real estate was losing its value, the temporary boom seemed to have collapsed, and Los Angeles County was fast losing ground—everything was on the down grade. But a change came over the scene two years ago. The first of January, two years ago, the railroad company announced to the world that a reduction had been made in the rates of freight on oranges to the eastern market, from $400 per carload to $200.

Now, the transportation company does not always do just the way you would like to have them do; and they do not always, in my opinion, pursue what would seem to me to be a liberal policy, and yet we have got to deal with them, as a fact. They exist, and they have got the advantage, and we cannot help it. We have got to deal with them as one business man deals with another. I am very glad this committee has been appointed, and feel thankful to whomsoever have used their kind offices in putting me on the committee, and I assure you I am in hearty sympathy with that movement, and shall do all I can towards getting the concession which we properly demand. The railroad company do not always do what we want them to do, but when we show that it is to their interest, as was done in Los Angeles, they will make concessions as was done there. When they reduced the rate at one time from $400 to $200 a car, what was the result? In February Strong & Co. were in Los Angeles buying oranges. We never bought any oranges on the trees. We had handled them for the growers on commission, and I presume that every one has received many letters from commission merchants in the East, where they are anxious to receive your fruit in that way. We were doing that way for the Los Angeles people, and we told them that we could handle their fruit and get as good or better prices as anybody. We were perfectly willing to do that, but to ship the oranges and to take the chances ourselves, we wouldn't do it. We made our commission, as was legitimate and proper that we should do, and we did a good deal of that business, but the poor fruit growers didn't get much out of it. In February and March, two years ago, we were in Los Angeles buying oranges, because freight had been reduced from $400 to $200, and I will say we made money in buying oranges on the trees and shipping them East. The point I am trying to make is, that the reduction in freight made an instantaneous change in the whole business, and in two months there were plenty of buyers for the remainder of the crop of that year; and last year we were down in Los Angeles and bought a good deal of fruit. Mind you the change in the prices: Four years ago oranges were selling in San Francisco at 50 cents a box at a minimum, and they didn't average over $1. Last year we paid to the growers $1 a box on the trees. We picked them, and packed them, and shipped them, and made money on them, and towards the end of the season competition was so strong that we were paying $2 a box on the trees in Los Angeles. Why was this so? Not because the fruit was any better, or because there was any less of it; on the contrary, there was a great deal more of it.

MR. WEINSTOCK: What influence did the failure of the Florida crop have on these prices?

MR. PLATT: Let me tell you, the failure of the orange crop in Florida was not felt there until later in the season. I suppose I could tell you that in Riverside alone at least one hundred cars had been bought before it was known that there was a failure, at $1 a box on the trees. I am correct in that statement, because I was down there and attended to it myself. Of course, I may be giving away business secrets, but, gentlemen, there is nothing in our business that I am afraid to show up in these matters. I had bought forty carloads and the news of the Florida failure came along, and I immediately instructed my agent to double his purchase if he could, and he had to pay as high as $2. Of course, the Florida failure had a great deal of effect, but, nevertheless, land you could buy in Los Angeles County five years ago at $100 an acre is now worth $1,000. I may be wrong, but the only reason that I can see for that great advance is the low rate of freight.

The fruit shippers are not going to be driven out of the market. It is a business they have been doing for the last twenty years, and they are going to continue to do it in some way. They may be obliged to modify their methods and to change their propositions in some way, but they are going to continue business. Now, my idea a year ago, and it has not changed, is this: that if the fruit union organized in San Francisco last year had worked to this end simply and then stopped, and used the combined influence of this great industry with the railroad company for the purpose of getting low rates of freight—you may say that you accomplished that, and I am willing to give the fruit union credit for it, although I believe that Mr. Stubbs has more letters on file signed by Strong & Co., requesting a reduction in freight, than he has from the fruit union, or from any other fruit grower or organization of fruit growers. We did get quite a considerable reduction, and it is not worth while to discuss to whom the credit belongs, but I say that if the fruit union had gone to the railroad with a solid petition and said, gentlemen, we want so and so, and secured it, and then stopped and said: "Now, Mr. Strong, Mr. Porter, Mr. Earle, Messrs. Lyon & Curtis, we have helped you in this way; we have secured a low rate of freight. Now, if there is any business in the East get it. We are willing to sell you our fruit." But no, we were cramped in this way—the fruit buyers knew that they had a formidable rival in the fruit union.

In the first place, we wanted to ship our cars with the fruit union, but they said no, you may ship with us, but we will charge you 5 per cent. It is very seldom that I have seen a net profit of 5 per cent on fruit shipments, notwithstanding others may differ, and think that the fruit shipper has been making a great profit. It is very seldom that it has averaged a net profit of over 5 per cent, consequently we could not accede to that proposition. In Los Angeles, the fruit union there shipped a great many cars last year that were loaded by us shippers, and we paid them 2 cents a box or 2½ cents. We paid them enough so that they were satisfied to do the business, as we would have been in the present instance, but we could not ship with the fruit union. It was not intended we should. It was not intended the fruit shippers should have any part in that work; consequently we did not ship, but we were not going to be shut out of the business. Consequently, Mr. Lyon, and Mr. Curtis, Mr. Earle, ourself, and Mr. Reed formed a sort of an organization, and let me correct a wrong impression that has gotten out among some people. The sole intent and the purpose of that organization was to get our fruit together on certain days, so that we might have enough cars to make up the fifteen-car train. There was no combination among us in regard to prices; on the contrary, we were competing against each other, and we did outbid each other in a great many cases. There was no understanding of any kind. These gentleman are here and will bear out what I say. The only object in that organization was to get the fruit together. We were all members of the so called Sacramento or California Fruit Growers' Association, and that association was organized for the purpose of permitting its members to ship their fruit or to sell them as they saw fit.

I may be drifting away from the subject a little, but the point I want to impress is simply this: I don't care whether the fruit is sold in Chicago, or New York, or Philadelphia, or Minneapolis, and these other markets, by auction or otherwise, so that we can get the full price that they will bring. I don't believe that it is possible that the fruit growers should realize the full value of their fruit by attempting to concentrate it all in one man's hands, whoever that man may be. Mr. Porter was the agent of the California Fruit Union, and I respect Mr. Porter very much, permit me to say, and I have never said a word against him or his methods of doing business; but it is simply human nature for one man, if he has got a monopoly of a thing, to make the most of it, and I don't know that I should do much better than Mr. Porter or any other gentleman in the room would do. And if Mr. Hatch, or Senator Buck, or my friend Mr. Aiken, or any of these gentlemen, if they had the entire management of the fruit of California, I don't know but what they would be able to make some money out of it in some way, and I do not suppose it is necessary for them to resort to dishonest means to do it. The railroad is the greatest monopolist we have. They make money simply because they control it all; they have all the business there is. They do not deny that, and I do not think that it is going to be possible for the fruit growers to organize any kind of a union so that they can act in conjunction, but if you can comply with the laws of trade, and then let the business take care of itself, it will be all right. You want low rates of freight, and that is all you do want when you get these low rates of freight.

In Los Angeles they have got nothing there that they can or do ship but oranges. Of course they can and do grow other fruits, but they have never made a business, as we have in the center and northern part of the State, of shipping these varieties of fruit. Here we have twenty varieties—apples, pears, peaches, plums, grapes. By and by we will have oranges, but for the present we will content ourselves with the others. All deciduous fruits that can be grown anywhere are grown in abundance, and to perfection, in this part of the State. Now, surely, if, with one variety of fruit, in Los Angeles the growers can run their lands up from $10 an acre to $1,000 an acre, with low rates of freight, and nothing else in the world to help it, can't we do it here? There is no reason why we shouldn't. You get low rates of freight, and you will have just exactly what they have in Los Angeles. There are fifty buyers there to-day, and here, at the present moment, we have only got a dozen or so; but if you get the rates of freight so that our fruit can be laid down in the East and will not be a luxury, as it has been in the past, with the fruit properly picked and properly packed, the whole question is solved and you do not need any fruit union; do not need any Sacramento or California association; all you need is what you naturally get in supplying the demands of the East. There are millions of dollars in money back there, millions of consumers and capital seeking investment for money and fruit, and at the low rate of freight you will have buyers to take it. These things we want, we must have, and the railroad company has got to come to it, and will come to it, sooner or later. Better cars, quicker time, and low rates of freight.

Mr. Weinstock: Will you allow me to ask you a question? Is there any advantage in having your distribution in the East regulated?

Mr. Platt: No, sir, I think not; not by any regulation. We can fix it, if you can regulate consumption and make people eat so much fruit all the time, but you cannot regulate the consumption; that must be done by the natural demands.

Mr. Weinstock: Can you give me an approximate estimate of about how much California fruit the City of Denver can use a week, judging from your past experience?

Mr. Platt: I remember that two years ago thirty-six carloads of fruit were put in there at one time, and those, of course, did not bring any profit to anybody. There are sixty-five thousand people in Denver, and just how much fruit they ought to consume is something for the political economist to judge. I can't tell; they ought to take care of eight or ten carloads a week at a good profit.

Mr. Weinstock: Would you call ten carloads, judging from your past experience, a minimum or a maximum—would you, as a shipper, if you had exclusive control, no competition in the field—would you ship more than ten carloads to Denver in one week?

Mr. Platt: It would depend on how much fruit I had and how much other people have that I didn't have any control of.

Mr. Weinstock: Granting you had all of it under your own control, and plenty of other places, would you ship more than that?

Mr. Platt: No; I think I should diminish it, probably, if I had plenty of other places nearly as good. That is a thing no one can answer. You will have to find out by experience, just as you have to find out whether it will pay or not. As you went along, you could tell. Two carloads properly handled might have a better or worse effect than a dozen.

Mr. Weinstock: As I understand it then, as near as you can judge, or as near as you can make an approximate estimate, ten carloads would be as much as you would send to Denver in one week. Supposing twenty carloads were sent to Denver in one week, what would be the result?

Mr. Platt: They may be able to take care of them. I leave that entirely to the dealers at that end. They know whether they can handle it or not. They will buy all they can take care of.

Mr. Weinstock: If a city like Denver can use ten carloads as a maximum, twenty carloads sent there by different individuals, isn't the result liable to be disastrous to those who send?

Mr. Platt: Yes, if you send at commission; if you sell it on orders it is not.

Mr. Weinstock: If there are many shippers in the field, is there not a likelihood of more than ten carloads going to the same place: wasn't that the experience of this season? Didn't cities, like Kansas City, west of Chicago, receive many weeks during the season a great deal more fruit than they could possibly handle?

Mr. Platt: Let me say, Mr. Weinstock, I think that the regulation should be left with the people who buy fruit. In Denver there are ten or fifteen parties that I could name who buy California fruit; they won't buy a pound if they can get it on commission; there is one principal firm who won't buy a pound. One case, a party who was handling our fruit on commission in St. Louis, and I telegraphed him, "No more fruit on commission;" he telegraphed, "The market is much better, send a carload sure;" we telegraphed, "We will sell you at certain prices." Well, he answered saying he would buy, and from that time on he bought. Let them understand they can't get this fruit to sell, they will buy the fruit if there is anything in it.

Mr. Weinstock: Without unity of action, can you get everybody here to not send on consignment?

Mr. Platt: Eventually we will get that unity of action.

Mr. Weinstock: The only point I desire to bring out in asking Mr. Platt these questions, is this: I desire to show, that unless there is unity of action at this end, there can be no regulated distribution, and without regulated distribution every community is sure to get a great deal more fruit than it possibly can sell, and that will be the result of this season's experience, and I think the results on the shippers and growers books will show.

Mr. Tompkins: There is another thing. Mr. Platt says they will buy just enough to supply the market wants. The fact of it is, they will come out here and pick out just what fruit they want, by keeping the price so high there, and that will limit the consumption, by making the profits they want to make, and the great quantity will go to waste just as it has done.

Mr. Williams: I think Mr. Platt has struck the keynote that will solve the problem. I think that we can take care of our fruits at this end, either by drying or some other way, and let those people come and buy the fruit, as we have done this year in Fresno. In regard to our grapes, we have made over two hundred thousand boxes of raisins this year, and only consigned five carloads. Everything is sold F. O. B., at Fresno; we have got our money, and most of us have spent it. Most of the buyers are from the East, and let them buy and take care of the fruit themselves, and we will stay at home and enjoy the benefits.

Mr. Aiken: On that very point I have this to say: We have had for the last thirty days in Santa Cruz County, at one station, about twenty carloads for eastern shipment, of good fall grapes, the latest grapes in the country, and no market for them. These eastern buyers, spoken of here, would pay nothing for them; they would take them on commission, and if we could not send them on a commission to these men, they would rot on our vines, and be a dead loss. There is one buyer who came here and sent a few carloads to Texas at a very good figure. We would have sold them all, but no buyers. And it is very necessary, it appears to me, to carry out this plan, and to have somebody appointed to whom we will send our fruit East, and have it sold and disposed of, if necessary, at public auction, and get a good price. We do not wish to be helpless and left to the mercy of the buyers.

The Secretary read the second resolution.

Mr. Weinstock: In regard to that second resolution, I desire to say this, that that resolution is fully in accord with the spirit of what my friend Mr. Platt remarked, that no one man should be given control of all California fruit. The observations that I made while in the East demonstrated to my mind very clearly that no one man, no one firm, no half a dozen firms, are competent to handle the entire eastern territory successfully. The effort this year to concentrate the products of California in the hands of one agent resulted in bringing twenty carloads to a city like Chicago at one time, when in the larger eastern cities, like Philadelphia, they scarcely got a glimpse of our fruit, and while fruit was rotting in Chicago, California grapes were selling at 50 cents a pound in Philadelphia. Therefore it is very evident to my mind, and I think it must be to others, who are taking the matter into consideration, that if we want our fruit properly distributed you must have an agent located in every large distributing point east of the Rocky Mountains.

Mr. Stevens: I would like to ask Mr. Weinstock to explain the difference between one-man power in this case and the other. The one man originally selects all these agents, so eventually it resolves itself down to one-man power, for I believe the general manager appoints the agent.

Mr. Weinstock: The management—all the Directors, not that one man. There is a very wide difference between the two. By the law that is in operation now, Mr. Porter, of Chicago, gets all the fruit that is sent east of the Rocky Mountains, and does with it what he chooses. He can either appoint an agent in a large city or not, as he chooses, and, as a rule, I think he has not appointed agents. So far as I could learn the entire control of the territory from Chicago to Boston was placed under the charge of one firm in New York City, Dudley, Clarke & Dow. Merchants in Washington informed me that when they wrote to Chicago for fruit they were referred to the City of New York, and told that this firm had been given control of that territory and their purchases must be made through that firm. That demonstrates the effect of one-man power; that instead of one agent that we must have fifty agents, and each one must be responsible to report to the agents here at Sacramento.

Mr. Stevens: The fruit union was composed of the fruit growers of California. The fruit growers selected nine Trustees, who elected the officers of the Board, and it was their duty to make the necessary arrangements to carry out the wishes of the growers. They selected a manager, etc., and also an agent, and made it obligatory on the part of that agent to appoint agents in all of the eastern markets, and it was so understood, and the growers were given to understand that the agent must appoint local agents in all those markets; therefore, if he did not do that, as Captain Weinstock says, what guarantee have we now, that it will be done by any Board of Trustees or management, that this organization could select? If it fails in one instance, why not in others? Another thing. Concentration is the great cry, and if it be true, as Captain Weinstock says, that four or five, or a dozen or twenty, agencies are to be established in a city, does that not bring California fruit in competition with itself? If you are going to concentrate, then the principle adopted by the California Fruit Union was better than that of Captain Weinstock, because there was one agent, and if anybody wanted to buy the fruit they would have to go to that agency in order to get it.

Mr. Weinstock: I desire to call Mr. Stevens' attention to this point: That according to the by-laws of the fruit union, as they now stand, there is nothing in them that compels the Board of Trustees or managers of the association to appoint any agents. This would be a law; a provision compelling the Board of Trustees not to appoint one agent for the entire eastern territory; not to give any one man control of all our fruits, and we will have them obey it, and if they don't, it will be the duty of the stockholders to see that they do it. The law would bind them to a point not to delegate the power to some one else, but to see that an agent was appointed in every city that would handle a carload of our fruits.

Mr. Stevens: In the contract entered into between the Board of Trustees of the California Fruit Union and Porter Brothers, of Chicago, those things were stipulated, and as I have said, he obligated himself to appoint such agents in all the towns and cities east of the Missouri River.

Mr. Hatch: That is so; that was in the contract wherever they could dispose of a carload of fruit to be determined by Porter Brothers.

Mr. Weinstock: He was to act under further directions from the Board of Trustees?

Mr. Hatch: He was not exempt from their suggestions, but he could appoint of his own will if he should see fit.

Mr. Weinstock: Supposing, in the judgment of the Board of Trustees, it would be well to appoint an agent for the City of Baltimore, could they go to Porter Brothers and insist on his placing an agent there, and would he have to comply with it?

Mr. Hatch: The necessity did not appear.

Mr. Weinstock: Was there no necessity for it, when the City of Baltimore with a population of four hundred thousand consumed only about a box of grapes a day?

Mr. Hatch: I think so; I think there was no necessity of it; if there had been sale for it they knew where to get it. In Baltimore they use an immense amount of fruit that they get from other quarters; they are differently situated from what other cities are. I have always claimed, after I had been there and looked over the matter some, that those eastern cities are filled up with European goods and goods from Central and South America to such an extent that they always have cheap fruits of some kind which come into competition with the high priced fruits. To put our fruits on those markets it would be necessary to do so at a minimum rate and in large quantities.

Mr. Weinstock: Is it not a fact that no city in the Union has more native fruit than Chicago?

Mr. Hatch: I think that most any of them have more, except it may be some berries.

Mr. Weinstock: That was not the result of my observations; and I do not think it is the result of statistics. Let me state what I saw in Chicago; and I think my statement would be corroborated by any person who was in Chicago this season. I found California grapes upon almost every fruit stand, and upon every fruit stall in the City of Chicago. I found that they were being retailed at the uniform price of 10 cents per pound; and I found, as a rule, native grapes, alongside of the California grapes, being retailed at 5 cents a pound, and in some instances as low as three pounds for 10 cents. I interviewed a great many of these retail dealers and standkeepers, and I put this question to them: "Which of the two grapes do you sell more of—California grapes, at 10 cents a pound, or your native grapes, at 5 cents a pound?" and the answer, almost without exception, was: "We sell about an equal quantity of each." In other words, that

California grapes, at double the price, sell as readily as the native grape does.

Mr. Hatch: I also believe that if you can place these grapes in New York, Philadelphia, Boston, and Baltimore, at a retail price of 10 cents a pound, then I say, yes, we require large agencies in all those places.

Mr. Weinstock: How are you going to sell your grapes at Baltimore at 10 cents a pound if you have no agency there; if the dealer in Baltimore has to send to New York to buy his grapes from a man who has not got them on commission? Let me illustrate. I came to New York City and found some of our own grapes, raised on our own vineyard, that had been sold by the firm of Dudley, Clarke & Dow for $3 a box. The returns made to us for those grapes did not exceed $1 75 a box. I found that the system under which those grapes were sold was as follows: That Dudley, Clarke & Dow did not receive their grapes from Chicago, and consequently they were not agents of Porter Brothers & Co. But there was evidently an understanding between Dudley, Clarke & Dow and Porter Brothers & Co. to this effect: That Dudley, Clarke & Dow were to have the privilege of going into the market just as soon as the carload of grapes arrived, and go through that car and cull out and choose lots and pay a fixed price, rarely ever exceeding $2, and that in return for buying the grapes and paying for them, they were to have the exclusive control of the eastern territory, and the result was, that the grapes that they were paying $2 a box for they sold in New York City for $3, and under the provisions of the by-laws the grower who sent those grapes was entitled to that $3, and all that Dudley, Clarke & Dow were entitled to was a fraction of the 10 per cent that Porter Brothers & Co. were to receive. The dealer in Baltimore had to send to New York to Dudley, Clarke & Dow, and pay him $3 a crate a single crate for those grapes. How are you going to get your grapes retailed in Baltimore under that system at 10 cents a pound?

Mr. Hatch: You cannot, according to your explanation of those matters, Mr. Weinstock. The business was not conducted on that side as we had expected it would be done, and as, by our contract with Mr. Porter, it should have been done. He should have had agents in New York, Boston, and Philadelphia, and whether in Baltimore or not, I do not remember; but I know he did at those three places, and the 10 per cent should cover all commission in all places where they take it in carload lots.

Mr. Cooper: I want to state to Mr. Weinstock that he didn't complete one comparison, that is when he interviewed these fruit dealers whether they would sell the most, eastern at five or Californian at five.

Mr. Weinstock: I just wanted to say that California grapes had no competition in the East; that they will not come into competition with foreign grapes; that California grapes are so vastly superior to any grape that comes to the eastern market that, even at a higher price, our grapes are in more demand, and at the same price it is sure to drive the foreign grape out of the market. Now, if in the City of Chicago we could increase the production of California fruits from three carloads a week to eighteen carloads a week, is it not reasonable to suppose we can increase it in the same proportions in other eastern cities? In the Cities of Brooklyn, Philadelphia, and Baltimore, each, at the time I was there, had only used on an average one crate of California grapes a day. What I wish to say is that no one man—no half dozen men—can canvass that eastern territory thoroughly and properly, and that with the experience of the past year and that by-law that compels the Board of Trustees to establish an agent in every city, and with the wakening that the growers and stockholders that this association have had this year, there is much less probability of that law being ignored in the future than it was in the past.

Mr. Block: The explanation that Mr. Weinstock made here reminds me of something that occurred during the time that arrangements were made with Mr. Porter, giving him his agency, which throws some light, and I desire to throw as much light on this subject as I possibly can. At the time that arrangements were made with Porter Brothers & Co. for the agency in the Eastern States, one of the firm of Dudley, Clark & Dow was in San Francisco, at the Palace Hotel, but the member that represented that firm did not come near the California Fruit Union.

Mr. Hatch: Excuse me, Mr. Clark was in the office twice while I was there.

Mr. Block: He was not there the day I was there. I knew that there was some kind of an understanding, and I know also that Mr. Porter did not comply with the requirements of the contract. In fact, the truth was that Mr. Porter was our master, and not our servant, nor our agent. I am not here to conceal anything. If I have made any mistakes I will point them out; and whatever mistakes were made were honest. I am in favor of the proposition made by Mr. Weinstock—let us have agents everywhere. I will go further than that. We must open up the eastern market. I believe I am not in accord with the proposition made by Mr. Weinstock—I am not ready to subscribe to the proposition of selling our fruit at auction. Let us open up the market. Remember one thing—that you are representing all the different sections of the State. There are other fruits you must consider besides the grape. We have the peach, the pear, the plum, and we must discuss and make a market for them. In this discussion there are portions of the business that have been ignored: for instance, the Santa Cruz Mountains, the Santa Clara Valley, and San Lorenzo. These sections are differently situated from Sacramento or Fresno. We require a different treatment. So far as the business is concerned, we do not; but do not ignore our interests; and when we come to treat with the railroad company we have business that requires different treatment. I know, when we went last year, Mr. Stanford agreed to carry fruit for us for $200 a car, slow freight. That has not been pressed at all. Three hundred dollars is what they charge, and we cannot afford to pay it. How can we open an eastern market with a rate of that kind against us. We cannot do it. You have got to help us, and we have got to help you. Let us put our heads together as California fruit growers and California fruit shippers, and let us act together for our mutual interests, and push aside any one that stands between us.

Mr. Rutter: There are a few things that we cannot ignore concerning the fruit interests, shipping, and selling in the eastern market. One is that there is about three cities—Denver, Kansas City, and Chicago—I would except. Aside from them the principal fruit merchants in the eastern cities only want a very limited quantity of California fruits in their market, for the very reason that it interferes with their regular trade, out of which they are making money and getting rich. Now, Mr. Platt's idea fails east of Chicago, and if we wait for those men to come here and purchase the California fruits you will have to dump them, because they won't. They want a very limited quantity, even providing the railroad rates were reduced. Another point I see of importance is, that adopting the auction principle in every large city, and that would justify somebody in giving a guarantee, in giving bonds. They are under penalty to do what is right in the premises, and return immediately after the sale remittances, which, under our present system, there is nothing positive or direct; everything is so indirect that we cannot get any satisfaction in any way, shape, or form.

Mr. Butler: A meeting was held at Newcastle, at which three members of the Board of Trustees of the California Fruit Union and Washington Porter were present. They came there for the purpose of interviewing the people of Placer County, and they stated that any questions might be asked by the people relative to the placing of this business in the hands of Porter Brothers. I was there, and I asked Mr. Washington Porter, directly, at the request of some of our people, if, as the business was all in his hands, he having entire control of all the fruits sent through the California Fruit Union, beyond the Missouri River; if, when a carload of fruit arrived in Chicago, there would not be a temptation, if he could get an offer—by way of illustration—of $1 a box for that whole carload, and turn it all over, and sell for $1 a box, when, by employing an agent at his own private expense, he could get $1 25 for it at some remote point; his commission being 2½ cents, which would net to the grower 22½ cents more than it would if sold in Chicago. He didn't make a direct answer to that, but tacitly admitted that such an opportunity might occur, and simply said: "But is it probable that I would do that, and thereby incur the ill-will of the people of California." And then the question was asked, whether he was to do this business and place these fruits upon all the eastern markets for 10 per cent only, or whether, when he put the goods in the hands of other people, there was to be a commission charged to the California Fruit Union additional to the 10 per cent. The question was put direct, and the answer was made direct, that he would place that fruit in the markets of the East at all points, appoint his own agents, and that he would only charge, in any case, the California Fruit Union 10 per cent for fully transacting that business. Now, I said on that, "Mr. Porter, you say that you will do this. Now, is there anything obligatory—anything binding you to do this. Mr. Porter, whenever a car can be placed at any other point profitably, will you put your agent into that field and do that," and he said he would. There are gentlemen here present, that were present at the time, who will verify my statement. Now, I leave it with you, gentlemen, considering the investigations made by Mr. Weinstock, and the evidence he has given here about sending fruit to Chicago in abundance—in excess—and sending it in such limited quantities to other portions of the East, whether that contract and agreement has been carried out on the part of the fruit growers' agent in Chicago.

The first section of the resolution was again read, and was adopted by the convention.

The second section was now read by the Secretary, which is as follows:

> That such association, through its management, appoint a commissioned agent in every eastern city that can use a carload or more of California fruits at a time, and that the management, by compiling such facts and statistics as may be at their command, arrange a table of distribution, subject to such changes and modifications as the market may from time to time demand; and it shall become the duty of the general manager of such fruit union to regulate the distribution of all fruits strictly in accordance with such provisions.

Mr. Weinstock: The idea that I had in mind when I wrote the resolution was that the management at this end would select the most competent, most reliable fruit dealer in each one of those cities, a man who could be trusted and relied upon and could give sufficient bond to guarantee payment for all fruit intrusted to his care, with the idea of having them sold at auction. The agent would be held responsible for it and return to the owner at this end the amount the goods had realized at auction. The reason I asked this was, I was in Chicago last June and stayed there a month, and also visited the cities where Mr. Porter had agents. Of course, those were fruit dealers, and every other fruit dealer in that city where he had an agent was antagonistic to him and wouldn't buy anything of him if he could get it himself.

Mr. Tompkins: As I understand it, these resolutions provide that the management shall have a right to ship to any other agent in the city, provided he sells at auction.

The second section was adopted as read.

The Secretary read the third resolution, which is as follows:

> That said management also establish regulations to control the quality, the weight, and the manner of packing all fruits offered for eastern shipment, and that its inspectors reject such fruits submitted for shipment as do not come up to the established requirements.

Mr. Hatch: I would like to ask Mr. Weinstock where that examination is to take place.

Mr. Weinstock: The resolution does not provide for any details. I simply take it that the management would evolve the details; but the plan, as I have it in my mind now—the best that has occurred to me—would be to the effect that there would be a clerk or inspector appointed by the management, at central points, where fruit usually congregates; one, say, at Vacaville, one at San José, one or two or three at Sacramento, perhaps, whose duty it would be, as soon as a lot of fruit would be delivered by a grower, to take a number of the boxes. He need not necessarily examine all. He would very soon acquire sufficient skill to judge by one box out of ten or twelve; and take these boxes and weigh them, and make sure that they come up to the regular standard in weight; open the boxes, and see that the fruit is in proper condition, and that it has been properly packed, and pass on it, perhaps, by using a stencil. That would indicate that the lot had been inspected and passed on. It should further be his duty to reject, in the interest of every man who submits fruit for shipment, any that is inferior in quality; that does not come up to the standard in weight, or that was improperly packed. There are very many growers who, from lack of experience, send imperfectly packed fruit and inferior fruit to the eastern market; and if their fruits are worthless, in place of having them rot here they send them on to the eastern market to rot, and paying all the way from 1½ to 3 cents freight for doing so. Now, I think any system that will save the inexperienced grower that cost will be a benefit, not only to him, but to the growers who are competent to send good fruit; because poor fruit depresses the value of good fruit in the eastern market.

The third section as read was adopted.

The Secretary read the fourth section, which is as follows:

> That the eastern agents be instructed to sell all fruits which may be consigned to them by the union, by auction, at public trade sales, and in no other way, the auctioneers' charges to be paid out of the commissions allowed those agents.

Mr. Block: I don't know how many are in favor of this, but I am not. I may be called an old fogy. I have always been conservative, and I am not ready to say that I want to take my property and turn it over at an auction sale. My entire year's work depends upon the proceeds which I realize, and it takes a great deal of expense to bring that about, and I am not ready to say that I am converted to the belief that the best policy is to let the Sheriff come in and sell to the highest bidder. If we continue business as we have the last year or so, I think the Sheriff will come in and attend to that by and by, but it will not be by my consent or by my invitation; it will be by a combination of circumstances. I am willing to contribute to some extent to make a trial of this, but to bind ourselves to anything like this I think is preposterous. You gentlemen that have early fruits here in Sacramento and Vacaville are figuring that you can sell your fruit to the shipper. I have no objection to your doing so; but you say to some of us who have later fruit, and come in between times selling our fruit in competition with eastern peaches, when they may have a perfect glut of fruit, and you propose to have it here, that our fruit shall be sold at auction to the highest bidder. Now, I am not ready; but I think if you can establish a regulation, if, after mature deliberation, you would conclude to try a little of it, I probably would be willing to join you, and willing to contribute somewhat towards it. Let me ask Mr. Weinstock: Suppose there was a proposition made in his business that every storekeeper in the same line of business, all the goods he has, would be sold at auction, would he sign that contract? I venture to say no. If the same proposition were submitted to Messrs. Strong & Co., Lyon & Curtis, Gregory & Co., and these others, I do not think they are ready to agree to it. I do not think they will buy your fruit with any such understanding. I am willing to consider this matter and give it careful consideration, but I am not ready to vote for it as yet.

Mr. Hatch: It is not a possible thing to try a matter of such moment as that in a small way; if we have auction sales of our fruits, it must be in sufficient quantity to make it an object to the buyers to come and buy it. And if there are any of us who do not wish to get the highest price that our goods will bring from those who buy such goods, we ought not to enter into such organization; therefore, each one ought to vote according to his judgment in that matter.

Mr. Aiken: I hardly agree with my friend, Mr. Block. The Sheriff will be out of sight, for he will only sell his fruit in auction at the East by a regular sale. The whole thing is to be done so that the fruit will be sold in a certain way. All other fruits from Florida and the Mediterranean are sold in that way; it is a matter of common business trade. It is established and well known, and all fruit brought into the United States that is perishable is sold at auction, except California fruit. Why not? Because, you see, California fruit men are not bright enough to seize upon that opportunity. Now, here is an opportunity, let us stand in with the fruit growers of the world, and put up our fruit. We say it is better; if it is, it will bring a better price. Let us try it, and try it faithfully. This is simply a recommendation, that is all; it don't bind Mr. Block, if he votes upon it. It is an experiment just now, looming up in the future; it looks bright. Let us recommend it, and give it a fair trial.

Mr. Rutter: If I understand the system in New York—I speak particularly of foreign fruits—is to have a limit on the goods which are perishable, on the grapes particularly, Almeria grapes; that the auctioneer is instructed to limit the price if there should not be a very good attendance of buyers; that they must reach a certain figure, or they would let it pass to the next day's sale. I acquiesce with Mr. Block, provided we are divided on this end of the route, and sell partially on the auction principle and partially promiscuously, like we have been doing. I admit that the auction system then would be a failure, bringing it into competition, but if we can send all our fruit to be auctioned off, most decidedly it will be the best thing for us.

Mr. Blowers: I apprehend that it would be found, after we have dumped a few carloads in the eastern markets, we will find that in some portions of the East the system of selling by auction will be proper in some places and improper in others. Suppose you wish to supply a place like Cleveland, Ohio, would it be proper to sell in Cleveland, Ohio, when the auction system had not been prevalent, and subject our fruits to the crucial test of an auction? I apprehend you wouldn't do it more than once or twice; but in New York and large eastern cities it is much different, and I apprehend the auction system would do well there, but not in all places where we wish to sell our goods.

Mr. Block: You will notice that this makes it obligatory. I would like to make provisions in it to authorize them to do so under control of the Board. I wouldn't give any one man that power. I wouldn't object if you find it profitable. If the fruit union adopts that proposition it is mandatory—they have no other choice. At a distance this proposition looks very well, you say. Yes, it looks nice; we will get our money. But suppose you get a draft to make up for freight, then we wouldn't get our money. Whenever we load a carload of fruit we look with fear. We send away our carloads with delight, but we are not half as delighted when such returns come. You must look to see what the returns are. You figure that the auctioneer will send you your returns immediately; but suppose the auctioneer sends you the returns for the freight money, as this year, not the auctioneer, but the agent has done. I think it would be better to make this recommendation to the fruit union that they may adopt this system, and if they find it profitable they certainly will do so.

Mr. Blackwood: I do not know whether I am in favor of the one tier system or not, but I know this, that most of the fruit shipped to San Francisco is in a sense sold at auction, and has been for years. I have sent fruit to San Francisco for the last fifteen years. It lays on the wharf; the commission man comes there, a buyer comes along and the commission man has got to take that man's price, or he doesn't sell, but must dump that fruit; so the fruit is in fact sold at auction. Suppose we send this fruit East with directions to sell one carload at auction, and another at private sale; what condition are we in? Just the condition that we are trying to avoid, to prevent our fruit from coming into competition with itself. We must either sell all our fruit at auction or none of it. We have tried selling fruit for some little time at private sale and it is unsatisfactory. Now shall we try the auction system, shall we try the system that I understand from Mr. Weinstock is practiced in New York? One day there is one, or two, or three carloads of fruit on a platform, boxes open to inspection, bidders come along who want this fruit, and they see a certain lot, and if it suits them they take a memorandum, the auctioneer mounts his stand at twelve o'clock and says, "How much for twenty boxes choice of the lot?" Now, there is a good many men wanting the choice of the lot, and they would pay something for their choice, and finally in a minute it is sold, and he takes his twenty, or forty, or sixty boxes at his choice, and so it goes until the whole lot is sold. The fairest way in the world; you have got your market. If your market won't take your fruit it is your misfortune, but if the market wants your fruit, you will get a good price. That is the way I look at it. It is intimated that the auctioneer may be dishonest. I cannot see how there is any show for dishonesty with this way of proceeding. The auctioneer has got his book and the books are open to the fruit union agents and Trustees.

Mr. Weinstock: Each shipper gets a copy of the catalogue with the price that the fruit has brought the day after the sale.

Mr. Blackwood: In that way how can he be wrong? I do not see but what every means is taken to protect the grower in the auctioning of the fruit as it is proposed by Mr. Weinstock. I am rather inclined to favor the auction system, inasmuch as the present system of marketing fruits is unsatisfactory. We have also heard a great deal that our fruits are not wanted anywhere east of Chicago; that the Mediterranean and Atlantic supply all demands east of Chicago. I have been in Philadelphia, I have been in Cincinnati, I have been in Detroit, and I find inquiry for California fruits wherever I go, and the reason they don't get them is that they can't get them short of 25 cents or 40 cents a pound. In St. Paul and Minneapolis, with one hundred and sixty thousand in the two cities, while our California grapes a year ago were selling in Chicago, only eighteen hours run from Minneapolis, for 15 cents a pound, and you could not get them in Minneapolis or St. Paul short of 40 cents a pound. That shows the inequality; that we have not our agents properly located and our fruit properly distributed. Let us have as many agencies as we think we need, and put them under guarantees that they will do honestly, and I think we can get a better market than we have yet got for our fruit.

Mr. Weinstock: Before this question is put I desire to answer some points that have been made by Mr. Block and some other speakers. Mr. Block would make it appear that this is an entirely new idea; that it is an experiment. I desire to call Mr. Block's attention to the fact that, while it may be an experiment so far as California fruits are concerned, yet it is not a theory, but a living fact, that the auction system does exist, and has existed for twenty-five years, and will continue to exist indefinitely as a success; that the pioneering has all been done by the growers of Spain, who have evidently undergone precisely the experience that we are now undergoing. They have tried the method of selling the fruit at private sale, and met with the same results that we have met with. They are the ones who are entitled to the credit of hitting upon this plan. We are merely followers in their footsteps. We are seeking to take advantage of their experience and their wisdom, and nothing more. But I hear some one say the cases are not parallel; that the Mediterranean fruits are not perishable, and ours are; and the plan that may apply with success to their fruits will not, therefore, apply to ours. In answer to that I would say that the fact that our fruits are more perishable than those from the Mediterranean is the strongest reason why we should adopt the speediest method of selling them; and invent, if you can, a speedier method than the method of selling by auction immediately upon arrival. Mr. Platt has here said, among other things, that the great advance in California oranges was due to the low freight. I will admit that low freights have a wide influence, while they have no influence whatever upon the market price that your fruits will realize in the East. The consumer there does not care. The buyer there is totally indifferent on the question of freights, whether you pay a cent a pound or 20 cents a pound. Your freights have no influence upon the price he is willing to pay, while the question of freight has its influence on your returns, and determines whether you shall get a large or a small profit on your fruits. It has no influence upon the consumption. The freights of the Florida growers are very much less, even, than the freight of the California orange growers; and, notwithstanding their low freights, their returns for the last two or three years have been highly ruinous, because they sold their fruits in the manner that we have been selling ours—indiscriminately. The fruit was thrown into competition with itself wherever it was sent, until finally they had the wisdom to follow this auction plan. They followed it last year in Boston with eminent success; and this year they have perfected their arrangements to have all their fruit sold in the City of New York in the same manner. I am satisfied it is only a matter of one or two seasons when the California orange growers will do precisely the same thing; and the sooner we adopt that method the less we will pay for our experience. Mr. Block raises the question, what will we do if we send our fruits to the auction, and only get 50 cents a box? Mr. Harrison is here, and he can tell you how much he got for some of his fruits under the present system. He sold not one box at 50 cents, but a great many.

MR. HARRISON: And less.

MR. WEINSTOCK: As I was stepping out of the hotel to-day, some one slapped me on the shoulder, and I turned around, and I saw that gentleman, and he said: "Are you Mr. Weinstock?" He said, "My name is Harrison; I am that unfortunate San Josė grower you wrote about. The conditions can possibly be no worse than they are to-day. We have tried private sales, and I have had enough of private sales. I presume a great many of you have had enough of it. If you adopt this measure at all, there must be no half way of doing, you must adopt it as a whole; you must make it imperative—decided. You must give the buyers at the East to understand that if they want our fruits at first hand, they could get it by auction, and no other way."

The portion of the resolution under discussion was adopted.

MR. HATCH: I will ask leave to introduce this resolution to go in right there:

> That it is the sense of this convention that all subscribers to the stock of the California Fruit Union should contract with the other subscribers that they will not sell any fruits for eastern shipment to any one except to members of said union. (Eastern shipment meaning East of Ogden.) Reserving the privilege to sell any and all fruits for any other purpose.

MR. HATCH: The object I have in presenting this resolution for your consideration, is that the nearer we come in our methods to concentrating our fruits in one channel for a proper distribution, is to my mind the only way that we will arrive at success. We have tried a diversity of shipments under different auspices, in the years that have past, especially this past year, and without success.

MR. BLACKWOOD: I don't know whether I am in favor of that; I rather like to sell to whom I please, and when I please. I think every man should be allowed to sell to whom he pleases, and whenever he thinks it is to his interest to sell.

MR. AIKEN: It is the same old thing over again. I want to do as I please. I want to sell my fruit. I want to sell it at private sale, which is to come in competition with my neighbor's fruit sold at auction. Now, we propose to place our fruit, all of it, and sell it at auction, and the resolution is very proper coming from Mr. Hatch, and it clinched the nail. We are going into it, going into it heartily, honestly, with our fruit—every pound of it. Mr. Blackwood wouldn't, I think, honestly sell his fruit to a shipper who would break down the system his neighbors have established for the sale of his fruit, but not every man is so honest, and we have got to bar the door, and let us have it fitted right here.

MR. HATCH: I would like to explain a little more, that the supposition in placing this resolution before you, is that the buyers and shippers of our goods will unite with us, and will take pot luck, so that nobody will dare to buy fruit or think of going outside the combination.

MR. BLACKWOOD: I agree with the principles advanced in the resolution, but it strikes me that if this auction system should be adopted by the fruit union, and all buyers warned to come in and take pot luck with the fruit union men in taking the fruit and putting it up at auction, there is scarcely a buyer in the world would run his little horse train against the fruit union. I don't think there is a buyer in the world would undertake it. Still, I do not think it is hardly proper for a man to say I won't sell. If a man comes in on his own private account and pays a good big price, and takes his own chances, why wouldn't he be allowed to sell.

Mr. Hatch: That is all right, but I think all those ought to stay out of this combination; we can't depend on them, that is all.

Mr. Rutter: It seems to me that is a bomb thrown into the enemy's camp. It may do after awhile, but it is premature now. We do not want the shippers to fight us, we want them to act with us.

Mr. Hatch: We want to have it so that they will come in and be protected.

Mr. Shinn: I approve entirely of the principle of this resolution. I only doubt the propriety of introducing it here, because it is evident that there is to be a new combination of all the elements to be brought together, and there is ample time to consider it. Modifications of these resolutions we have passed will be made undoubtedly. We want to bring these elements into an arrangement that would be satisfactory to all, and after that has been effected then a resolution of this kind will be just the thing.

Mr. Hatch: Our bug laws a few years ago, when it was possible to destroy the insects, were premature. We have tried one year without concentration, and now every man sees the necessity of concentration, and I propose this as a means of concentration. Without concentration we have been a failure; with it we may have success.

Mr. Tompkins: I shall vote for the resolution with a very big aye at the meeting next January, but I think it would be very much better when the shippers have come in with us. Of course, if they do not come in with us there is no use in having the auction plan. If they do come in with us, then they will be ready to join with any such resolution as that, because it is protecting themselves as well as us.

The resolution offered by Mr. Hatch was adopted.

The Secretary read the concluding sections of the resolution, which are as follows, and they were, on motion, adopted:

> That members of the union shall be allowed the privilege of naming points of destination for their fruits, and the further privilege of naming their own consignees; and it shall be the duty of the general manager to faithfully observe such wishes, provided the space allotted to such points of destination be not all taken, and provided such members also instruct their consignees to sell their fruits by public auction, and at the same time and place at which the fruits consigned to the agent of the union are sold.
>
> That the management of said union shall make such rules as will place all members on a level, and will make it impossible for any member or members to permanently monopolize any special market to the exclusion of other members.

On motion of Mr. Aiken, the convention adopted the resolution as a whole, and the convention adjourned until to-morrow morning, at ten o'clock.

FIFTH DAY'S PROCEEDINGS.

Mr. Williams: I have a telegram from Mr. Lubin to his partner, Mr. Weinstock, as follows:

To Weinstock, Lubin & Co.:

Convention Union, Central, and other road managers at Chicago to adjust and fix freight rates. Opportunity to ask concessions for fruit growers. If appointed committee by convention, will act. Telegraph Sherman House to-morrow.

D. LUBIN.

This telegram was answered by the Committee on Railroads, and we ask that this convention indorse our action in the matter. Our reply was as follows:

D. Lubin, *Sherman House, Chicago, Illinois:*

You are appointed by the California Fruit Growers' State Convention to represent it at the Railroad Convention in Chicago. Want passenger time; ten cars, $300, Chicago; $400, New York and Boston. Slow freight, Chicago, $150.

ELLWOOD COOPER.

On motion it was ordered that this convention authorize the committee to appoint Mr. Lubin its representative, as above stated.

Mr. Hatch moved that the Chair appoint two additional members of the committee to frame a law in relation to fruit pests. Carried.

The Chair appointed Mr. S. J. Stabler, of Yuba City, and Sol. Runyon, of Courtland, Sacramento County.

It appearing that Mr. Anderson, of the committee to interview the railroads, was away from the city, Mr. Edward Curtis was appointed in his stead.

Mr. A. T. Hatch read the following essay on the

ALMOND.

What I know of the almond is very little; therefore it will not take much paper to contain it. *This is it:* There are as many varieties of almonds as of peaches, although generally it is supposed there are only three kinds. The almond requires considerable room, say not less than twenty-four feet apart; farther apart is better. They will not grow in the water, nor do well in a heavy, poorly drained place. The almond root is the best for the almond, although they do well on peach roots. *They* will not unite well *with apricot roots.* The almond will do well on lands not rich enough to produce good crops of peaches, apricots, or cherries. No shrubs or vegetables will do well between almond trees after the first year, if the almond trees do well, as they are heavy and long time feeders. Almonds, to pay the grower, should bear well every year; hull easily; have clean, thin, soft shell; a smooth, bright, plump kernel. They do better out of the fog than in it. Almond trees should be as young as possible when transplanted from nursery. Large trees are objectionable, even if only one year from bud. My best success has been in dormant buds, although they did require more care than one-year old trees *the first* year. They should be pruned the three first years, to form the trees, then only to thin out objectionable branches. Summer pruning is to be avoided.

Good cultivation, very good cultivation, is essential. No irrigation, if a little rain. I find California seedlings to be more hardy than the imported kinds, suffering much less damage to the crops from frosts. When bleaching is necessary, the nuts should be thoroughly dried; then sprinkled and submitted, while damp, to the fumes of sulphur for about seven minutes; then dried, and taken up same day. Twenty-five pounds or more of thin-shelled almonds per tree at 15 cents per pound, that will hull easily, will pay the producer much better than fifteen pounds or less per tree, of such as will only bring 10 cents per pound, that are difficult to hull. I have tried it. Almonds will make better returns from leaner lands than any other product, except it may be wine, olives, or figs. Almonds with long, single kernels are preferred in general to such as have double ones. The Languedoc has proved a failure whenever tried in California, so far as producing regular paying crops goes. In case of a strike of help when gathering almonds, you may bid them good day, and get another supply of help to gather the crop; while if it were apricots or peaches, it might be necessary to give the fruit and boxes to the help to save it from decay.

Mr. Shinn: No doubt it has been the experience in every neighborhood that the almond is not a good bearer. I do not believe that this is so.

Mr. Hatch: Do you know of your own knowledge where the Languedoc does bear regular crops?

Mr. Shinn: Yes, sir.

Mr. Hatch: How much do you call a crop, per tree?

Mr. Shinn: I believe that fifteen pounds per year would be a big crop, and a light crop from a half to a quarter of that. In my neighborhood the Languedoc bears good crops. Every other year it will bear heavy crops, and every other year bear a light crop—perhaps a quarter of a crop. I know in other localities that it is looked upon as a poor bearer. What I want to say is—there is great encouragement in the growth of the almond, and if they have doubt about the Languedoc let them apply to Mr. Hatch and get some of his seedlings, and I have no doubt that they will do well. I do not believe myself that there is any better almond grown than the Languedoc. It is a very pretty shaped fruit, plump, short, neat, and the kernel is always nice and very fine flavored. It is an important culture, and there is a great future to it, and I want to recommend it in every place where they bear well.

Mr. Gray: I do not agree with Mr. Shinn about the Languedoc being the best almond. I believe Mr. Hatch's seedlings are much better and more valuable; still, I know that in some sections a Languedoc bears a very regular crop. In our ranch, at Chico, the Languedoc has been, for the seven years that I have been there. We have only had one light crop, and that was occasioned by frost. Every other year we have had a good crop right along. I cannot tell the average per tree, but we have had from sixty to seventy pounds; that is, we have had an average of a full sack on one half of the orchard; one half seems to bear more than the other, for some reason—larger trees. They are larger trees, and must be eighteen or twenty years old. They are grown on land that borders on red land.

Mr. Wilcox: Mr. Shinn's place is so situated that the sea breeze does not reach him, and there he raises the very finest of almonds. That is an exceptional place, and it is where the soft shells do well. In Santa Clara County generally, every variety of almond has not proved a success. We have large orchards over in the dry, loose soil, towards Los Gatos, and they do very well in certain places. My observation and experience has been that the best almond in any locality is the seedling that originated there.

Mr. Klee: I have observed different seedlings of almonds, in different localities, and invariably they have struck me as being much healthier than any known varieties, such as the Languedoc, showing much better leaf and resistance to the red mites. I know of one or two instances around here, and also in the foothills near Los Gatos, where there are several seedlings, and, at least one, that is thought a great deal of. They are healthier and seem to do better in every respect.

Mr. Hatch: I did not speak in favor of my own almonds. I said the California seedlings, just the same as these gentlemen have noticed. I have noticed it wherever I have been, and seen almond trees, that seedlings as a rule bear well, and in many cases, in different places, are better almonds, in my estimation, than the Languedoc.

Mr. Shinn: I have planted Mr. Hatch's almonds and have great hopes of their success more than any others. I want to ask Mr. Milton Thomas how the almond succeeds in the southern part of the State?

Mr. Thomas: The almonds in Los Angeles County, so far as I know, have been a failure every time. I have trees that have been planted ten or twelve years, and never have got more than a few pounds of almonds from a tree.

Mr. Williams: I had the pleasure of visiting Mr. Hatch's place this summer, and was very much gratified in the appearance of his almonds. There was one or two varieties that were perfectly festooned from one end of the limbs to the other. I have no idea what they would bear, but it looked to me as being enormous crops. In regard to Los Angeles County, I remember some years ago an experiment that was tried there by Mr. Meserve, of Pomona, of budding the Kings soft shell on the Languedoc, and all the rest that were contiguous to that were especially good. There may be something in fertilization of the almonds.

Mr. Hatch: I want to say a word in regard to that. The first three hundred almonds I planted I bought from Mr. Kelsey, of Oakland—I bought Languedoc. Next to the three hundred was one tree that was different from the rest; it was a peculiarly growing tree, had beautiful almonds, much nicer than the Languedoc in appearance, but it did not bear very well. Around it, every tree on every side for one or two rows from that, bore heavily; with the exception in that one place, those Languedocs never bore a crop. I do not call five or ten pounds a crop of almonds. I would get five or ten pounds on the tree, but around that tree the Languedoc raised from twenty-five to fifty pounds, and afterwards I noticed the same result where I planted a few Languedocs adjacent to a lot of seedlings. This year I intend to plant one hundred acres of almonds, and I intend to plant five different kinds of seedlings in alternate rows.

Mr. Shinn: One of my neighbors has a block several rods square, with a large number of Languedoc trees, and he says in one part of the orchard is a seedling tree of hard shell almonds, and all around that, he says, the Languedoc almonds bear heavy crops every year. It seems possible that the Languedoc is deficient in self fertilization, although I have examined it with all the care I know of; the blossoms seem to be perfect with pistils and stamens. Still there may be something in that.

Mr. Gray: The orchard of which I spoke has quite a number of hard shells of various kinds. I think there are about ten kinds of hard shells, most of them Languedoc.

Mr. Hatch: One thing more: I regard the seedlings as better than the Languedocs, for the reason that they bring more money. My Languedocs I held for 12½ cents, and I got 13. The poorest seedlings I had sold for 15 and I am holding the others for 16 and 17½, and have been offered 17½ for one quality, and I am holding that for sixty days, as my commission merchant says I will do better.

Mr. Ellwood Cooper, of Santa Barbara, read the following essay on the olive:

THE OLIVE.

To enter fully into the subject of the culture of this important tree, would make an essay entirely too long for the purposes of this convention; I will therefore confine myself to the material facts, the knowledge of which all who anticipate planting an orchard should be familiar. In presenting those facts I cannot do better than to copy largely from a treatise on olive culture written by myself and published in 1882.

Propagation.

The common and preferred method is to plant the cuttings, taken from the growing trees of sound wood, from three quarters of an inch in diameter to one and a half inches, and from fourteen to sixteen inches long. These cuttings should be taken from the trees during the months of December and January, neatly trimmed, without bruising, and carefully trenched in loose sandy soil; a shady place preferred. They should be planted in permanent sites from February twentieth to March twentieth, depending upon the season. The ground should be well prepared and sufficiently dry so that there is no mud and the weather warm. In Santa Barbara near the coast no irrigation is necessary; but very frequent stirring of the top soil with a hoe or iron rake for a considerable distance around the cuttings is necessary during the spring and summer. About three fourths of all that are well planted will grow. My plan is to set them twenty feet apart each way, and place them in the ground butt end down, and at an angle of about forty-five degrees, the top to the north, barely covered. Mark the place with a stake. By planting them obliquely, the bottom end will be from ten inches to one foot below the surface. In Europe the trees are planted from twenty-seven to thirty-three feet apart. My reasons for closer planting will be given in a subsequent article.

Pruning.

The cutting will throw up numerous shoots or sprouts, all of which should be left to grow the first year; any disturbance of the top, affects the growth of the roots. It would be advisable, however, where there are two or more vigorous shoots of about the same size and height from the same cutting, to pinch the tops of all excepting the one to be left for the future tree, so as to throw more force and vigor into that one. In the following spring, when the ground is warm and sufficiently dry, all sprouts excepting the one to be preserved, should be carefully removed, cutting them off close to the cutting. The top end of the cutting should also be removed by the aid of a sharp saw. A post should be firmly planted, so that the tree can be well secured, to keep the trunk straight, and avoid any disturbance of the roots, and should be kept until the tree is four or five years old. By adopting this method a great deal of time will be saved, and better trees secured. The lateral branches should be allowed to grow until the tree is two or three years old; but in every case when any of said branches are rapidly making wood, they should be removed, and not allowed to rob the trunk.

In the pruning during the first years, have only the one object in view, that is to force all the woody growth into one main trunk. This being done the tree will naturally form a beautiful shape. The cultivator must not look at the tree of to-day or to-morrow, but the tree of ten years hence. All branches to the height of five to five and a half feet should be removed, so as to admit of close cultivating by horses.

Fruit Bearing.

Trees growing from cuttings will produce fruit the fourth year, and sometimes, under the most favorable circumstances, will give a few berries the third year. It is the habit of the tree to overbear, and as a consequence will give but little fruit the year following a heavy crop. This statement is verified by the most reliable books published on the subject in the French, Italian, and Spanish languages. There are, however, exceptions to this rule in California. Mr. Davis, who had charge of the San Diego Mission orchard in 1875, assured me that he had gathered from the same tree, two years in succession, over one hundred and fifty gallons of berries. I have also observed that some trees in my orchard have borne well successive years. The fruit bearing can be controlled by the pruning. The cultivator will not forget that the shoots or branches must be two years old before they will give fruit, hence, partial pruning every year, will give partial crops. My oldest orchard was planted February 21, 1872. At four years I gathered from some of the trees over two gallons of berries. In 1878 over thirty gallons each off a few of the best trees, the orchard then being only six years old.

In estimating an orchard, the yield of isolated trees, or trees of great age, occupying considerable areas of ground, must not enter into the basis of calculation of the probable production. The tree mentioned in the San Diego Mission orchard as yielding one hundred and fifty gallons of berries was more than fifty feet distant from those surrounding it.

Our climate is congenial to the habit of the tree; it blooms from the first to the tenth of May, and the fruit forms from the first to the tenth of June. At this season we have our best weather, free from extremes of either cold or heat. Nowhere in the world are all the conditions so favorable to the perfect fruit bearing.

Fruit Picking.

The olive usually ripens in November. In some localities in eastern countries during favorable years, the fruit picking for oil begins as early as October, and for pickling, in September. In Santa Barbara the crop of 1880, as also that of 1878, was unusually late in ripening, not being ready to pick before the middle of January—a delay of fully two months—the cause, no doubt, owing to the extraordinary rainfall of these two years. The fruit should be gathered as soon as it turns purple, and before fully ripe, as the oil will be lighter in color and more fragrant, but somewhat less in quantity.

In Europe the common method of gathering the berries is to knock them from the trees with poles; they are then picked from the ground by old men, women, children, and cripples. This plan has serious objections, the fruit being more or less bruised, causing decomposition, and the contact with the earth is liable to give the oil an unpleasant taste and odor.

I have arranged on a ranch wagon, platforms with ladders securely fastened, so that the fruit from the different heights of even large trees, can be gathered from the wagon, which is driven along the rows, and one half of the trees picked from each side. This plan obviates the necessity of moving ladders, climbing, etc., and relieves the pickers from the labor of carrying the fruit, as the sacks containing the same are always at hand on the platform. The leaves and imperfect berries are separated by passing the whole through a winnowing mill. This process leaves the fruit in the best possible condition, preparatory to manufacturing the oil.

Making Oil.

The berries are dried before crushing, as it is necessary to evaporate a portion of the water. If, however, they are left out on the trees until shrivelled, which is proof that necessary evaporation has already taken place, no drying is needed after picking. This late picking is not best, as mentioned in a previous article. If dried by the sun, it requires about fourteen days. This plan cannot be depended upon, excepting years when the fruit is early ripe, and we have continuous sunlight, with moderately warm weather. By artificial heat ranging from 110 degrees to 130 degrees, the drying can be done in less than forty-eight hours. The crushing and pressing should follow without delay—that is, the fruit taken from the drier in the morning should be crushed and pressed the same day. Long intervals or delays in the process from picking the fruit to expressing the oil tends to rancidity. To make perfect oil requires a perfect system in the whole management. The capacity of the press, the crusher, the drier, and the number of pickers should correspond or be about equal; all fruit picked during the day should be in at night, cleaned the following morning, and go into the drier immediately after the previous day's drying is taken out. The heat or temperature of the drier ought to be so graded as to complete the work in forty-eight hours, and it is better that it should be under 130 degrees rather than above. Economy will necessitate in the business a system in the different branches of the process admitting of no delays from the beginning to the end.

The almost universal method of crushing the berries is by a heavy stone, similar to a millstone, which is rolled around on the edge in a deep circular groove or trough, and by its weight does the crushing. A beam passing through the eye of the stone, and working on a journal in the center of the circle with a horse attached to the outer end of the beam, is the simplest way to do the work. The circumference of the trough depends somewhat on the size of the stone.

To make one hundred gallons of oil each day would require two good presses. The press I am using is an old-fashioned wooden beam press, such as used in New England and Middle States for making cider. The crushed olives are put in the press in cheeses about three feet square, and three inches thick, with wooden slats between each cheese. Ten or more cheeses can be put in at each pressing. I use coarse linen cloth to contain the crushed olives. The fluid that is expressed is put in large tanks, and left for sixty to ninety days, when the oil will separate, and being lighter will rise to the top, where it can be drawn off. The pomace, after the first pressing, is recrushed, and by pouring hot water over it a second pressing is made.

Filtering or Clarifying.

This is a simple process. The most common method is to have a series of five or six boxes, one above the other, each with cotton batting in the bottom; the oil passing the sixth will be beautifully clear and ready for market. I use cylindrical tin vessels holding about three gallons each, one fitting in the other in tiers of three, with fine wire sieves in the bottom of each. On these sieves I place two or three layers of cotton batting. The oil is passed from one tier to the other until clear. It should be kept in an ordinarily cool place, not exposed to sunlight or heat, neither should it be handled any more than is absolutely necessary in the filtering and bottling, and should not be shaken after bottling. The mucilage contained in the oil will not separate for a long time after the oil is ready for use, and, as it does not injure it, is not, therefore, objectionable. It will sometimes form in the bottles like globules of water, or in films settling to the bottom as sediment, and when shaken will give it a muddy appearance, which, with the common prejudice against all table oils that are not perfectly clear, renders it unsalable, as consumers consult more the eye than the taste. The oil is better when new and fresh, and what is gained in the appearance by its remaining a longer time in the tank, is more than lost in its freshness and delicacy of flavor.

Pickling.

There are different methods of preparing the fruit for pickles. The one adopted in Santa Barbara is as follows: "The berries are put in fresh water, which should be changed every day, for forty or fifty days; then put in salt brine, not very strong, and after remaining a few days, drawn off, a second brine substituted, made nearly strong enough to bear an egg. The water should be boiled. Keep the olives well covered with the brine. Great care should be taken in handling the berries so as not to bruise them. The easiest plan, when picking from the tree, is to drop them in water. They are usually picked when they begin to turn a purplish color."

Another method, copied from the "Pacific Rural Press:" "Pick the olives as soon as they begin to show a reddish cast, and rinse them in clean water. Then take one ounce of concentrated lye and dissolve it in water. One third of this solution put in water enough to cover one gallon of olives. After a day or two pour off this water, and add another lye of the same strength. This may be repeated once more, as five or six days are consumed in taking out the bitterness with the lye. The lye should be used until the fruit suits the taste. Then the olives are put in pure fresh water until the alkali is well removed. This can be ascertained by the color of the water and by the taste. In salting, use the best Liverpool 'coarse fine' salt, the amount being about ten pounds to the barrel of olives, water enough being used to cover the fruit. Barrel up tight, and keep in a cool place. All the process should be conducted in the dark, as the light is apt to injure the color. The celebrated olives pickled after the manner of Picholini are put under a treatment of lye made more alkaline by the addition of quicklime. After leaving the olives a certain length of time, until the pulp separates easily from the seed, a condition which depends upon the strength of the lye and the size of the olives, they are then washed and put in strong brine. In the south they flavor with fennel and coriander; sometimes they substitute in place of the seed a small piece of anchovy and a caper. In the latter case the olives should be in oil."

Diseases.

My attention was called, as early as 1874, to the condition of the trees in and around Santa Barbara, from the ravages of the *Coccus oleæ*, commonly known as the "black scale," and which was always followed by the black fungus. An olive tree once attacked with the scale bug, unless cleaned, will soon be infested so that it cannot bear fruit. Such fruit as is borne during the period of rapid increase of the insect, will not make oil. There are numerous other diseases mentioned in French books, which have not yet appeared in California.

Remedies for the Diseases.

Pruning is the most essential thing and the remedy of the greatest vital importance. If trees are properly pruned, so as to admit of free circulation of air and the sunlight, more than half the battle is made; in fact, trees in such condition where the ground is well tilled and kept free from rubbish are not so liable to the attack, and if attacked, each scale insect can readily be seen and should be removed without delay.

Orchardists who adopt this plan will have very little trouble, even in badly infected districts. A casual examination of several different parts of each orchard should be made as often as once a month. This can be done on horseback, or in a light wagon; and in the event of the appearance of scale insects, then a careful examination in that part, and a remedy applied to exterminate them. The insects will be found to inhabit that portion of the tree where the foliage is most dense, where the sunlight is shut out, and free circulation prevented. There is not so much in the remedy as in its application. While certain remedies may be effectual in the hands of some, in the hands of others they will not be sufficient. Eternal vigilance is the price of success. Constant watching and constant fighting is the only sure plan to prevent the spread of insect pests in localities where trees are affected.

The remedy that I have finally adopted as being the most effectual, is the application of kerosene oil, and as laid down on page 3 of the report of the Los Angeles convention held one year ago.

I refer you to the discussions on this subject at the various conventions; also, the reports of the State Board of Horticulture, and especially to the remedies recently recommended by B. M. Lelong of Los Angelès.

To sum up: I copy from my report published in the last biennial report of the State Board, on page 50: "The olive is a rapid grower, and bears abundant crops. It would seem to be the tree of all others that should claim the attention of the people, and the planting be encouraged. There is, however, much yet to learn to enable the grower to keep his trees free from the black scale. No other tree seems to yield so readily to the attack. The increase is so rapid, and the insect so persistent, that it is yet a question whether in large areas, closely planted, it can be kept in check at a cost that the fruit will warrant."

ELLWOOD COOPER.

SANTA BARBARA, November 1, 1886.

MR. THOMPKINS: I desire to ask the best varieties?

MR. COOPER: That is a question I cannot answer, all my experience is with the common Mission variety.

MR. WILCOX: We have several varieties in the nurseries of Santa Clara County, that were exhibited at our fair this fall in pots that were bearing—several new varieties that were considered profitable. The old Mission kind we have at Santa Clara; have been planted there perhaps seventy-five years, and they have been bearing, and there they have made their own oil. We have an extensive plantation there up towards the hills, and they consider the old variety a good variety; nevertheless, they are experimenting with these new kinds.

MR. GRAY: I would ask if any pickles have been made as yet that will compare with the imported.

MR. COOPER: I have heard it stated that Mr. Del Valle, who has recently deceased, has put up some pickled olives that are far superior to anything that was ever imported into this country, and I think that the Kimball

Brothers, in San Diego, have arrived at perfect success in pickling the Mission olive.

Mr. Hatch: I would like to say that I have met different people who have been used to olives all their lives, and good olives, and who have said that they have eaten better olives, to their taste, at Frank Kimball's, in San Diego, than anywhere in the world.

Mr. Cooper read the following essay on the English walnut:

THE ENGLISH WALNUT.

The English walnut as known to botanists, *Juglans regia*, is unisexual, bearing both the staminate and pistilate flowers. "Juglans" is a contraction of "*Jovis glans*" (glans of Jupiter). Evidently the naming party had a high idea of this most valuable tree. It is a native of Persia and Himalaya; was cultivated by the Romans in the time of Tiberius, in the year 42 before Christ; has been extensively grown in southern Europe down to the present time. The tree does well in England, but does not begin to bear until about the twenty-fifth year. I have seen a very large tree in Bartram's Garden at Philadelphia, probably seventy to eighty feet high. Was told by the owner that it rarely bore fruit, and never more than a few in any one year, probably from the severity of the weather during the time it produces the staminate flowers. This period in Santa Barbara is from April first to fifteenth.

The plan of propagation in California is to plant the nut in nursery form in the spring of the year, in well cultivated sandy loam, about six inches deep. The first year they will grow from six inches to one foot high; the second, from one and a half to three feet; the third, from five to six feet. At this period it is considered the best for transplanting to permanent sites. The trees are generally planted forty feet distant each way. An orchard planted in proper soil and well taken care of, will begin to bear the eighth year, and when ten years from transplanting will give a handsome return.

During the first years, constant pruning is necessary, to have the tree properly shaped. I have pruned in a summer as many as four or five times. Branches are apt to grow too rapidly, bear down with their own weight, and break off during high winds, destroy the symmetry of the tree, and occasion much loss of time. All lateral branches growing from the leader should be cultivated to assume an upward angle from the main leader of about fifteen to forty-five degrees. This can be done by clipping off all branches growing under, and at times cut off the ends. A trunk should be maintained free from limbs five and a half to six feet from the ground. Earth should be kept away from the trunks, and if the top roots near the trunk are exposed, so much the better; it will assist the tree in breathing. The most careful cultivation is necessary, and nothing, after the fifth year, should be grown between the rows.

The fruit is easily gathered, as the husk opens and drops the nut. The fruit should be gathered as soon as it falls, and properly dried. In a drying house, well ventilated, it requires about twenty-four hours at 120 degrees. In the sun, from ten to twelve days. When well cured, they will keep sweet for more than a year. The meat is unsurpassed as an article of food; it gives to the system all the strength and vigor that can be obtained from animal food, is more healthful, and of greater economy. One acre in matured trees, for food-giving sustenance, would equal very many acres devoted to beef growing. Rancid nuts should not be eaten.

From the "*Bon Jardiniere*," a French work, I copy the statement that "the nut furnishes about half the oil that is consumed in France;" that "the tree there at twenty years gives a passable product, at sixty years the maximum quantity;" that "the tree grows from sixty to ninety feet high;" that "twenty good trees grow on a hectare of land" (two and one half acres). This would be about eight to the acre and seventy-three feet distant from each other. That "3,000 francs is a possible crop per hectare," equal to $225 per acre, and from eight trees, or $28 per tree; that "the annual production of twenty good trees is often worth more than the value of the land;" that "whole orchards have been destroyed on account of the great value of timber for manufacturing furniture." Notwithstanding this apparent unwise policy, it has been, and is still going on, and the denuded orchards not replanted.

At my home at Ellwood, in Santa Barbara County, taking the very best yield I have yet had from fifty-five acres, the crop of this year, sold at a good price, gives only $128 per acre. These trees were two-year old plants set in the ground in the springs of 1872–3–4. Many of them are now touching in the center of the rows. To prune them back will be a great work. To take out every other one and give them eighty feet each, which we will probably be obliged to do sooner or later, will give us only about seven to each acre.

The production as above is a good showing, but when we consider the time that the walnut grower has to wait for a crop and the value of the land for other purposes, say for lima beans, it is, after all, not so much. The area of land suitable for successful walnut growing is very limited. It requires well drained, deep, sandy, bottom land, well protected, and where no "live oak" trees have grown within the last century. Everywhere where the live oak has been recently rooted out the walnut tree will die about the time it bears the second crop, perhaps earlier. The second planted to replace will die in about the fifth year; the third, in the first, second, or third year. I doubt if any fruit trees will do well where an oak forest has recently existed.

The elder Pliny, in his natural history, written nearly two thousand years ago, speaks of this fact existing on the northern coast of the Mediterranean, and cautions planters from attempting fruit growing where an oak forest has recently existed.

There are various other causes, no doubt, that will prevent success. Trees will die apparently without a cause, and the planter, after waiting ten or a dozen long years, will be compelled to root them out and try something else. One half the orchards that have been planted will never be a success.

My advice to those anticipating walnut growing is, first visit the various localities and profit by the experience of those now engaged in the business. In Santa Barbara there is no irrigation. A very interesting paper on the walnut was read by F. R. Willis before the Los Angeles Pomological Society, at Downey City, October seventh last, published in the "Los Angeles Sunday Herald" of the tenth. Mr. Willis presents extreme views, with which I do not agree.

ELLWOOD COOPER.

SANTA BARBARA, November 1, 1886.

MR. GRAY: About a year ago now there was some kind of a fungus found on young peach trees in Chico. They were very healthy trees and had grown very fast; in fact, it was one of the best orchards we had. I noticed about the time that we got through picking the peaches that there was quite a number that did not look right. We could not see any cause for their leaves dropping off earlier, but about this time I noticed around the bottom of the tree that the dirt was cracking, and digging down in I found large quantities of a sort of a jelly that had accumulated around the bottom of the tree, and in digging in there seemed to be a fungus that was working right in between the bark and the wood, and you could see just where it worked. It seemed to penetrate right into the bark, and the long and the short of it was that we dug up about a hundred trees right around there, and those that were the worst we dug them up and burned them right on the spot. I sent samples to Dr. Harkness, Mr. Cooke, and Professor Hilgard. They all gave a different reply, and Dr. Harkness said he had his under examination and would report later what his decision was. We never have heard anything more from it. I thought it was something very serious. We dug up all the worst ones and tried a mixture of soft soap and sulphur on some of those that were just slightly affected, where there was only one root or a piece of a root affected, and then covered them up with dirt, and this year, so far, there is very little sign of it. I see a half dozen trees, perhaps, altogether that had begun to look as though they were not just right. I would like to know if any others have experience of that kind, and the remedy.

Mr. Williams: I examined those trees in the University grounds that were treated as Mr. Klee recommends, and it was eminently successful; all the defective parts had come out smooth, and I think it is the wash for this disease of the pear and apple.

On the suggestion of Mr. Hatch, that there may be a vacancy in the State Board of Horticulture, because of the removal of Dr. S. F. Chapin from the district in which he was appointed, and on motion, the Chair appointed Messrs. A. T. Hatch, Gilbert Thompkins, and I. N. Wilcox as a committee to ascertain whether such vacancy does now exist. After retiring for a few moments' consultation, the committee returned and reported as follows:

Mr. Hatch: Your committee is ready to report that they find that Dr. Chapin is a practicing physician at this time in Placer County, having moved his residence there, and is not a resident of any part of the district for which he was appointed, and your committee suggest the name of A. Block, of Santa Clara, to fill the vacancy in the State Board of Horticulture, caused by his absence from the district.

On motion the report was adopted, and the convention recommended to the Governor the appointment of Mr. Block, of Santa Clara, and the committee were instructed to present Mr. Block's name to the Governor.

PROTECTION TO THE FRUIT INDUSTRIES.

Mr. Cooper in the chair: The question now before the convention is "Protection to Fruit Industry." I will read from the report of last year, which will bring the matter squarely before the convention:

> I will state how it operates with regard to my business—making olive oil, growing almonds, and English walnuts. We pay labor $1 a day and board. The boarding costs us about 35 cents, say 2 francs; labor 5 francs, equal to 7 francs. In the south of France, and Italy, they pay labor 1 franc; the boarding costs not over 1 franc; total, 2 francs; difference 5 francs, or equal to $1 per day on every laborer employed.
>
> The freight from San Francisco to New York on oil is $60 per ton; from the Mediterranean $15, or one fourth; so that without an import duty, other things being equal, it would be better for me to proceed at once to Southern Europe to carry on my business. With walnuts and almonds we make the same comparison, except that the freight on these to New York is $40 per ton, and from south of Europe about half as much.
>
> While I wish to avoid any political discussion at this meeting not pertinent to our actual demands or necessities, I will, in this place, state that if we want laws to protect

and encourage the greatest prosperity of our State, we must, as intelligent citizens, look after the framing of them. We cannot plead indifference, or pre-occupation; we cannot ignore the community in which we live, our district, our county, our State, or our common country.

Mr. Aiken: This matter of protection to our fruit of California is one of vital importance in the contest for the markets of this country. At the last State convention at Los Angeles, after quite a long debate, they took a decided and a unanimous stand upon this question. The memorial that was there adopted was sent not only to our own delegation, but to the most prominent members of Congress, and there was one good result from it, to wit: That the Mexican reciprocity treaty was not put in force; but now there is a new Congress to go into session, and with many new Congressmen that we have not reached before, it would be well to pass a new memorial, or resolution, to be forwarded, to see, first, that the reciprocity treaty with Mexico is not put in operation; and second, that an effort be made, especially as to prunes, and the raisins, and the nuts, and the olive oil of California, so that all the members of Congress may study the subject that we ask them to legislate upon. I think it would be well for this convention to adopt a memorial to Congress and try it again. To bring the matter before this convention, I would offer the following memorial:

MEMORIAL OF FRUIT GROWERS OF CALIFORNIA.

Sacramento, Cal., November 19, 1886.

To the honorable the Senate and House of Representatives of the United States, Washington, D. C.:

Your memorialists, the fruit growers of the State of California, assembled in their annual convention at Sacramento, this nineteenth day of November, 1886, most respectfully represent:

That the soil and climate of the State of California are adapted to the production and preparation of the prune, the raisin, and the olive, of good quality and in quantities sufficient, eventually, to supply the demand for such products in the United States.

That these important industries are in their infancy, and stand in great need of protection from competition with foreign prunes, raisins, and olive oil produced by the cheap labor of Europe.

Your memorialists have found by actual experience that the present duties of 1 cent per pound on prunes, and 2 cents per pound on raisins, and $1 a gallon on olive oil afford no real protection and give little encouragement to those engaged in these great and growing enterprises in California.

That an import duty of 3 cents on prunes and raisins and $2 per gallon on olive oil would enable California to successfully compete with the world on these products in the markets of this country, and pay fair and full wages to American labor.

The growing of the orange and lemon in the United States should also be encouraged and protected from competition with like products of foreign lands, and in the opinion of your memorialists the duties on these products are entirely too low.

Your memorialists further represent: That the Mexican reciprocity treaty now under consideration for congressional action, seriously threatens the future of many agricultural industries in the United States, and especially that of fruit growing in California.

The long established policy in this country of the protection and encouragement of American labor and American industries, should not be changed so as to practically protect and encourage Mexican labor and agriculture.

The Mexican reciprocity treaty would in effect admit the Republic of Mexico to the Union, to a share in our great prosperity, and give its people a right to compete with Americans for trade in our markets without bearing the burdens of this Government, and without any love for this country.

Your memorialists therefore respectfully and earnestly request the Congress of the United States to so adjust the tariff on the products above referred to as to make us a prosperous and independent people; and to decline legislation intended to enforce and put in operation the Mexican reciprocity treaty.

Mr. Thompkins: I am entirely opposed to building up any industries by unnecessary duties. I am a tariff reformer, and this industry has been brought up by the present tariff, and if we cannot grow figs or prunes without the aid of 2 or 3 cents per pound to help us, take them out; then we can grow potatoes, or many other things. There are enough things in this country that can be built up without such aid.

Mr. Block: I am partially of the same opinion as my friend Mr. Thompkins, but this is a matter that interests us, and we want a protective tariff in this instance. We are in the same condition as Pennsylvania, and all other sections of the United States. Now, I have no direct interest. I do not propose to go into prune growing, or olive oil manufacturing, or anything of that kind; but whatever is of benefit to this State is of benefit to all of us, and we are all directly or indirectly interested in it, and I think the proposition there is a very moderate one. I notice that protection is given to Pennsylvania and to other sections. We have to pay a protective tariff on every production of those sections, and that other portions of the United States should assist us in building up our industries is simply just. There is no State in this Union taxed as much as California for the benefit of other industries, and now we ask for a little help, and I, for one, would be glad to see my neighbors get some protection.

Mr. Wilcox: This subject is one of the most important ones, and relates to a leading industry of my county. We have the largest prune orchards, probably, in the world, and we have a peculiarly well fitted soil and climate for the production of this article. Who would have said, ten years ago, that we could make a wine that would sell in any of the markets in the world? Who would have said, ten years ago, that we could make a raisin? Who would have said, ten years ago, that we could make a prune that would sell in the markets of the world? And yet it is this very principle, as applied, that enables us to do it to-day. Mr. Blowers, it is true (the pioneer raisin man), took his raisins to the world's fair ten years ago this year, and he got a premium there at the Centennial over the raisins of the world. Now this industry has grown up under protection, and yet it is hardly able to stand alone. Mr. Blowers, himself, has stood up against every discouragement, and to-day he feels the want of a little more support. I want to say to the young man to my right, the reason we want protection, the reason I do not want to raise potatoes or something else, is because we have too many potatoes or something else already. We want more prunes. The time was, when I was a boy, that prunes sold for 75 cents to $1 a pound. It is only under this protective system that we are enabled to eat prunes to-day. We want to grow them and send them into the families of every consumer throughout the land, poor and rich alike; for it is one of the healthiest and best articles of diet that can be found. I am not extending these remarks, but only give expression to a view which is universal in my section, that it is this principle that brings our land up to its present value, and that, if properly carried out, will cover the whole valley with little homes of five and ten acres, with a peaceful and contented population; a principle that will bring into our country millions of dollars annually, that will come into circulation and build up the manufactures and insure prosperity throughout the State.

Mr. Wilson, of Tehama: I believe in equal rights to all and no special privileges to any; and I believe that our Government was based upon that principle. I ask for no rights that I would not accord to the most humble neighbor. When the tariff was taken off of wool and put on the manufactured article, the cry went up that it would ruin our sheep industry. Instead of that we have seen the wool industry go steadily on, and this year we are getting a higher price for our wool than before. What affects us more than anything else is the freight on our produce. We want to stick together and choose a farmer to be a Railroad Commissioner, one who will watch and protect our interests. We want a stringent usury law in this State; we want money, and cheap money, to pay our hands off and improve our places; we want to put our farmers and producers in the Legislature and in Congress, and to have a farmer as a Railroad Commissioner, instead of having to get some lawyer or some creature that never produced a turnip. Now, then, we are to blame, and we never will have a different state of things until the farmers get together in convention and stand together, and put men in who are in sympathy and interested with them.

Mr. Thompkins: One word in regard to what Mr. Wilcox said. In the first place, I don't know that it makes so much difference whether this memorial goes to Congress or not, because Congress gets a great many in a year and does not always read them; but I have eight hundred prune trees myself of different kinds, and they do fairly well with me; but if you put on this duty it is not going to add 2 or 3 cents to the price per pound, and if you put on this extra duty you will send a great many more into the business and build the business up by artificial heat to artificial proportions entirely, and then when the natural result comes, overproduction, you will want more tariff.

Mr. Wilcox: Our prune laborers to-day are competing with the lowest priced laborers of the world; there is no lower laborer that I know of than the laborer that produces the prune of the foreign countries. With us we have the men that want to build up a comfortable home, and we want to see the laborer prosperous in his business. I don't see any shadow of overproduction, and until that shadow comes upon us I shall have full faith in the future.

Mr. Kimball: I have been a protectionist all my life, born and brought up in that policy, but it appears to me to be inopportune at this time in California with the present conditions of the development of our tree and fruit industry, to go to Congress and solicit of them an increased duty. It seems to me a wrong would be perpetrated on the people who are to consume our fruit. During the last three or four years there has been great progress made East in the consumption of California dried fruits, and while the dire necessities of Santa Clara and Santa Cruz Counties, where my friends reside, may require it, I cannot see that it is for the best interests of this State or the people of the United States, that they should all be compelled to pay 4 or 5 cents more per pound on raisins or 2 cents more per pound on their prunes than they do at the present time, to gratify the financial necessities of these gentlemen or any of their friends.

Our fruit industry is in an embryotic condition just now, but it is rapidly developing, and I can see in the near future the interest developing under its present status to a hundred times its present proportions. We have here on our borders a great country where it is impossible to raise such fruits as they need; such fruits as enter into the daily consumption of the people, and there we can have a market that can be greatly increased every year; we can see that this desire for California fruits is growing more and more, and to-day if we had a hundred tons of certain classes of dried fruit where we have one, the market would take them all and call for more. Even if there is no duty on almonds, my friend, Mr. Hatch, feels very comfortable in raising and selling them at a good fair price, and others are enjoying the same pleasure; but with the raisin, the fig, or the prune interest, they are already protected sufficiently to correspond with the difference in productiveness and the price of labor between here and Europe. I look forward to the time when these industries, and perhaps, the date industry—because we have a large area in the southern part of this State that in some future period of development, can be made to produce all the dates that North America will consume—I look forward to the time when these interests will be the greatest interests of the State, even with no duty at all. I have learned by conversing with gentlemen in the raisin business, that they made from $100 to $200 an acre from their raisin grapes, and I know from persons who are engaged in the prune industry that they are making all the way from $50 to $250 an acre profit from their prune orchards.

We heard here yesterday a golden account of the fig business, that would almost induce everybody in California that was not already in it, to jump right into it at once, because it was so immensely profitable. Still they ask for an increased duty on all these things. You must remember that the whole United States does not have the fertility of soil, nor the congenial climate of California. The people all over the East are glad to cultivate the soil at a profit of $10, or $5, or $2 an acre. There are thousands of farmers scattered all over the United States, from the Gulf to the northern boundary, that are satisfied with a profit of $2 an acre on their land every year, and it seems to me to be asking a great deal, that the people of the United States should tax themselves for the purpose of putting such large additional profits into the pockets of California fruit growers.

Mr. Wilcox: I believe if we understood ourselves a little better, we would not be so far apart. I want to say to Dr. Kimball, that he has not quite stated our condition here. That a large majority of the producers of this State have mortgages on their farms, that the extra capital to be used, has to be used at a higher rate of interest than any other part of the world, and that these producers have to employ manual labor to keep their heads above water, and to-day they are paying better wages than in any other part of the world, and still we are asked to double the price of labor that we are now paying, so as to use white labor. Public opinion expects we will pay these men well. Now, our people are to live comfortably; a great number of them first live in their barns, waiting until they get a good crop to build comfortable houses. We want every man to live comfortably and well, and in view of this fact that this labor, we are asked to exchange for other labor. I am not in favor of this Chinese labor, but we have had to use it. I say we must do something to maintain our position, so that we can make everything we have here, and successfully. Now, the grapes are not picked to-day in the Santa Cruz Mountains for the reason that they do not pay. There is no use for us to disguise the fact; they are the right kind of grapes to make the best kind of wine, yet we have not the capital and the wine cellars to dispose of that wine, consequently we are not able to handle it. Now, then, when we have the same means of harvesting and disposing of these crops, why we should prove in some cases partial failures, everything is not right, nor bright, sunshiny climate for everybody. It is with this view, of keeping men aboveboard, and protecting them and their peculiar positions in this new country, that I wish, at the present time, to say that it is safe to ask and safe to receive a certain amount of protection, sufficient to give us a good start and make us prosperous. If the time ever comes when our orchards grow up, and we are able to raise these things easier, and can do it, why, then, and not till then, we may say we can dispense with this protection which we now seek.

Mr. Stabler: My proclivities have been through my life in the direction of what is called free trade, but really tariff for revenue only. Now, this is a question that cuts sharply two ways. It may be said of the doctrine that is set forth in this memorial that it will have the effect of keeping in this country money that otherwise would be sent to foreign countries; there is no question about that. I am very much American in my feelings, and feel very desirous, where we can do so consistently, to keep the money paid by consumers in our own country; but, on the other hand, we must bear in mind that if there are ten producers of these articles spoken of, upon which the duty is sought to be increased, there are ten thousand consumers. Now, of course, our legislation should be directed to the benefit of the many and not of the few. I would be much pleased if it were policy and proper for the whole country that these industries here should be increased; the producers would, of course, be increased, with profit to the industry and it would become more general, which would be a great benefit to the Pacific Coast; but I would not like, myself, for this convention to go on record as advocating a doctrine that was not sound and was not for the benefit of the many. . Therefore, I say, I am not inclined to vote for this memorial. There are thousands of things that we could make here that are manufactured elsewhere and are sent here, and under the influence of a tariff for revenue levied chiefly upon articles consumed by the rich can be had by the consumer for very much less. It is true that California is adapted to these peculiar articles that are embraced within the memorial; but it is so small and it affects only a portion of the country, and as very much the greater number would be injured to the benefit of the few, I don't think the memorial ought to pass.

Mr. Hatch: I produced some almonds and a few prunes, and expect to have more. The way I look upon our country here, I don't consider that it is necessary nor advisable to ask for any increase of the tariff or for further protection. One reason is, although I have not land to sell, there are a great many that have who wish to induce immigration, and I don't think it is advisable to show to the world, directly or indirectly, that it is necessary to have protection in order to enable us to produce those commodities which we boast so much about our ability to produce, and produce at a profit. I don't think it is necessary, besides, for the reason that with some things we have no tariff, and we do not need it. There is no trouble about the sale of goods. Now, this year, for instance, all the prunes (of which we have had a good crop this year, I understand) are sold already at good prices; our raisins are in large demand, and there are large crops at very remunerative rates, although the amount of protection on them amounts to but little in comparison with those proposed.

Mr. Block: Will the gentleman allow me to ask a question? What price did the prune bring two years ago?

Mr. Hatch: About 4 or 5 or 6 cents.

Mr. Block: Hardly.

Mr. Hatch: I claim that this is one of the most profitable crops we can raise in localities adapted to the growth of them; that is the prune, at anywhere from 4 to 6 cents a pound, put up nicely for market. I have thought for years that they will soon fill the place of the European prunes, even at a valuation higher than others, as our people become used to them and compare them with the imported article. It is true there are some prunes coming here in small quantities, great, big, flattened prunes, an inch and a half in diameter; well, if we have not the variety to make them of, let us get it. Those bring very fancy prices; let us get the variety and make them like those, or as near as we can, and I will guarantee they will taste better, because our small prunes do taste better than those that we import. As to our raisins, as has been shown, Mr. Blowers' raisins took the premium over any on exhibition from any part of the world ten years ago. Who will say we have not improved largely since that time in the manufacture of raisins? There are raisins in Sacramento and San Francisco now, from different parts of the State, than which none ever were introduced into our State that would excel. I believe that California is capable of producing more prunes, more raisins, more olives, more almonds, to the acre, and of better quality, than any other country in the world, and sufficiently so to overcome all this necessity of assistance from the tariff.

Mr. Aiken: This memorial substantially was presented at Los Angeles and unanimously adopted. I met on the floor the same gentlemen who have spoken to-day. It is a repetition of the same argument, and was very fully and fairly discussed, and was debated at great length. The prune growers of this State have received about $100,000 for their crop, with the protection of about 1 cent per pound, and $2,000,000 have been sent from the United States to foreign countries where prunes are produced at probably an expense of 10 to 15 cents a day for labor. We have succeeded, by the greatest effort in the world, to retain $100,000 to brighten our homes in California. We are in our infancy; we are not strong; and if we can be properly protected we can set out prune orchards in places in this State where they can be grown profitably, and in a few years we can compete without any aid with Europe. We would learn their ways; we would profit by their experience; and with lower freights we would stand some show, but now we don't. Last year we did not get enough for our dried prunes to pay for the boxes, or for the labor of drying them in the State of California. When we sent our prunes to the East we were told by eastern merchants that the foreign prunes had supplanted the California prune; that they could get them for less money; and they got them down to 2½ cents per pound in the eastern market; and we cannot produce the prune profitably with the protection of 1 cent; so we lost our prune crop last year for want of proper protection. Who wants $2,000,000 sent to foreign countries, when we could keep the two millions of money here? Who wishes to deal with the foreign hordes, who pay very little for wages and sell their produce in the markets of this country at so reduced a figure? Open the door, and the result will be that everything we enjoy that we use would be probably raised in China or Japan; open the door, and the hordes will come in, and we will have no business, no money with which to purchase anything. It is time that Americans were Americans. It is time that Americans should protect themselves; and those that observe the tendency of the times say that if there is any policy in this country that is gaining it is that of protection; and in a very few years there will be very little opposition to a fair, honest protection for home industries.

Mr. Kimball: I don't wish to take up the time of the convention, but it seems to me to be inopportune at this particular juncture, when all these interests in California are so prosperous; when the lands in Santa Clara County that have prune orchards upon them are valued at from $500 to $1,200 per acre; when the vineyards at Fresno and Riverside are worth from $80 to $1,000 per acre; when they are paying a good interest on the present prices, and with our present tariff I think it is inopportune to say to our brethren over the mountains, that you must pay so much more because we want it. There is no justice in it; there is no equity in it. It would be a fine thing for our silk manufacturers if we could manufacture silk in California or in the East and bar out the produce of the vast silk manufactories of France and of Italy, but it cannot be done under the present conditions of labor and the circumstances that now exist, and we must submit to conditions that are inevitable. In regard to this fruit interest, I am deeply interested in it. I am raising prunes, and I can raise prunes on land that is worth $800 per acre, at present prices, and make money every year. I can make $100 per acre, net profit, and if that does not satisfy a modest man I don't know what will. We are doing well, and we should not wish to do any better, because we are making more money in proportion to the investment than any other class of men that are engaged in any other agricultural enterprise in the United States.

Mr. Wilcox: Dr. Kimball, as I understand, has a full bearing orchard of prunes, and has been enabled to take off $100 an acre from that orchard. That is not a case which applies to the great orchards of California that need protection. Dr. Kimball's orchard does not need protection, perhaps, but the great orchards of this State are yet in their infancy; they are not yet bearing, or some are beginning to bear, and the question is whether you will uphold this industry to any extent?

Mr. Wilson: Are not the prune growers just as prosperous and just as well off, and have not they made just as much and more money than us wheat and barley raisers? Are they not better to do to-day, and are they not in a more prosperous condition? And do we ask any protection as wheat growers or barley raisers?

Mr. Block: I will answer the question. If there was wheat imported to the United States, the same as they import prunes and raisins, the wheat growers would ask protection, and I would say, seeing the competition, that they should have it.

Mr. Wilson: Would you deny me the right to take my wheat to Liverpool and exchange it for goods? When I should come back to Boston Harbor, they would charge me a royalty for getting these goods home.

Mr. Block: There is no comparison. I don't wish to enter into any discussion here. I am against high tariff, but with a debt in the United States of $1,100,000,000, there is no such thing as the abrogation of the tariff; there will be a tariff without regard to a political question; for it is no political question. Because Randall, who is a representative of the Democratic party, and Judge Kelly, who is a representative of the Republican party, both from the same State, always agreed on the tariff—on the protection of their State, because it was their State. There is no difference of politics there. I am employing no less than twenty men at any time, and sometimes sixty to seventy-five, and the lowest wages I pay is $1, and from that to $2 50 for daily labor; how can I compete with a place where, I am told, that the men who pick prunes in foreign countries are getting 26 cents a day, and the women 16 cents a day for their labor, without board. By the aid of protection we will be better able to pay our employés. Now, gentlemen, it is said that we are getting such high prices for the land. I will say that I will sell land for considerably less than I sold it last year; and you can buy a great deal of land for a great deal less than the quotation in the papers.

Mr. Butler: The industries that are covered by this proposed tariff in our country, are those that are not guarded in other sections of the United States, but are peculiar to this particular section. We are in a location that is comparatively isolated from other sections of the country, and the expense of getting our produce in the markets of the world are very great. Now, it would seem proper and consistent that while we are in our infancy in the production of these things we are having a great expense to carry on our hands, and we are laboring under very many difficulties, and it would be proper and appropriate to get protection on those industries and to keep out products of other nations until such times as we have developed our resources and when our products are introduced, and when these people cannot compete with us it would be proper to remove the tariff, but it would seem to be eminently proper, while our people are making these developments, to have this protection.

After some further discussion, the memorial was adopted.

The following gentlemen were, on motion, requested to prepare essays named, to be presented at the next annual meeting of the convention: Milton Thomas, of Los Angeles, on Crystallized and Dried Fruit; Mrs. Berger, 219 Washington Street, San Francisco, on Japanese Fruits; W. H. Aiken, on the Prune; R. B. Blowers, on the Raisin; M. Silva, on the Small Fruits.

It was resolved, on motion of Mr. Wilcox, that the essays to be prepared for the next annual convention, should not exceed fifteen pages of manuscript in length, and shall take up not so exceed fifteen minutes to read.

On motion it was ordered that the matter of the programme for the next convention be referred to the State Board of Horticulture, to arrange and to select such further persons as they may choose to present matters that they may deem of interest to the convention.

Mr. Hatch moved that the State Board of Horticulture be requested to call two conventions, one in the southern part of the State, and one in the northern part of the State, and at such time and places as they may deem proper.

Carried.

The programme as arranged having been concluded, the convention, on motion, adjourned sine die.

REPORTS AND PAPERS BY THE INSPECTOR OF FRUIT PESTS, W. G. KLEE.

Report of the Inspector of Fruit Pests. W. G. Klee, on the Conditions of Orchards and Nurseries visited by Him during the Months of June, July, August, and September, 1886, with Sundry Observations bearing on the Fruit Industry.

Read before and approved by the State Board of Horticulture, at the meeting in Sacramento in November, 1886.

To the honorable the State Board of Horticulture:

GENTLEMEN: I hereby submit to you an abbreviated account of my visits to the various portions of the State since the first of June, 1886. My visits to each locality have necessarily been short, as it has been my endeavor to get a general impression of the state of affairs over as large a territory as possible. In my resumé of each county I have drawn attention to existence of insect pests as well as such points as might be of interest. These remarks are necessarily rather broad, but may, I trust, be of use to persons unacquainted with many sections in the State. In a subsequent report I have dealt with the most important insect and fungus pests, and given such suggestions as to their extermination as experience has taught us during the last years. From my observations, I feel confident that fruit growers need not feel despondent, as regards subjugation of the various insect pests; although, by no means, have we perfect remedies for everything, we have made great progress in our knowledge of them, and in many instances may defy the insects wholly. There is, however, one thing evident, and that is, that unless active coöperation exists, especially in thickly settled localities, certain insects will always remain a standing menace, and the diligent work of the enterprising will be thwarted in a great measure. To effect this, some organization is necessary, in one form or another. The question is how shall this be accomplished, will be a proper theme to discuss by the convention now in session.

ALAMEDA COUNTY.

This large and prosperous county was one of the first counties to embark in fruit growing, and has kept on steadily increasing.

San Leandro—San Lorenzo.

Some of the oldest orchards in the State exist in this section, which, owing to the deep, rich soil, are holding out well, although in some instances the cherry trees are showing signs of retrogression. Blight diseases of pears are also frequent, and in unfavorable seasons affect the different varieties of fruits considerably, especially the apricot, causing scabby and gnarled fruit. The codlin moth long ago found its way, and is most industriously fought by the leading growers by banding the trees, and various other devices; but, owing to many scattered trees in adjoining villages, the work has been far from satisfactory. In some few orchards, also, the pernicious scale has been spread, most probably from imported trees, and in any old orchard the owner, of course, works at disadvantage in eradicating the evil. I am, however, sure that the people are too enterprising to let anything of that kind take permanent hold. A few years ago the canker worm made its appearance, but, owing to the persistent fight, and the intervention of a hymenopterous parasite attacking the worms, they seem to have been virtually conquered. The cherry slug proved this season quite troublesome and affected many trees, as if fire had swept over them. Spraying with whale-oil soap and sulphur was applied, but rather too late; done a few weeks previous it would have prevented this. The woolly aphis is in every old orchard.

Young trees are constantly being set out, especially plums, prunes, and apricots. The most suitable stock for the heavy soil has proved the Myrabolan plum. Cultivation of peaches must be confined to such varieties very little subject to curly leaf. A visit to Tozetti S. Leandro's nursery found this in excellent condition.

Haywards and Castro Valley.

The road to Haywards is through a belt of older and many young orchards. The same complaints having proved serious in the last named places, affect the tree here, although the canker worm so far has not been seen much. The older orchards are composed of the same varieties of trees as in San Leandro, but the tendency is to leave the apple alone. The new plantings are chiefly pears, prunes, and apricots; this is especially the case in Castro Valley and the valley land above it. Along the road to Haywards, English walnuts have been planted, and this year are producing considerable fruit, but their appearance is not healthy. Undoubtedly they would flourish much better on the native California (*Juglans Californica*) stock, which especially reaches perfection here on the adobe lands. Oranges and lemons are planted, and the latter have, by Dr. E. Kimball, been made a source of profit. They are, as might be expected, subject to the black scale.

Planting of small fruits between the young trees, is the rule here as in San Lorenzo, but owing to the low price of currants, and the latter being subjected to the currant borer, has not proved very profitable of late.

Niles—Centreville.

My visit to this section was made very early in the season, and my acquaintance with the section is not as thorough as I should have wished it to be. One of the oldest places here is the orchard and nurseries of James Shinn. A good many comparatively rare trees have been planted here, and are now showing their adaptation to the climate. Among them are the Japanese loquats, which are doing remarkably well, bearing the ninth year from seed, this year producing fruit of good quality, and yielding well, sixty-four twenty-pound boxes being picked from fifteen trees.

Lemons and oranges are also doing well, but one of the most interesting trees is the carob tree (*Ceratonia siliqua*), which commenced bearing last season, and this year has increased. All kinds of nut trees, as pecan, and English walnuts, are growing well, but are much excelled by a variety, by Mr. Shinn called the Persian, which seems especially well adapted to the climate, and, judging from its behavior here, is worth recommending for localities where other varieties do not seem to be suited.

Since writing the above, I have learned that Mr. H. Meek, of San Lorenzo, also has several large trees of this variety which are doing exceeding well.

The section cannot pride itself of being entirely free from the *Aspidiotus perniciosus*, some few orchards being somewhat affected, but this section must, on the whole, be considered a comparatively clear one as far as this insect is concerned.

The immense establishment of the California Nursery Company is located on ground previously occupied with grain, and was commenced this spring. It is in excellent state of cultivation, and the stock thrifty and healthy, and I believe free from any injurious scale insects. No old orchard is nearer than one mile to the nurseries, which adjoin the young orchards of Mr. James Shinn.

ORCHARDS IN SAN MATEO COUNTY.

The condition of the small orchards belonging to the private estates in San Mateo, Menlo Park, and vicinity, is very bad. The woolly aphis is present to an extraordinary degree, and in every orchard I visited; and the codlin moth is allowed undisturbed sway. The pear slug is present, and has affected the growth of the trees seriously. But the most dangerous pest of all is the cottony cushion scale (*Icerya purchasi*). No system of fighting it has been adopted, although individual owners have tried their best. One gentleman, Mr. J. T. Doyle, has cut down over two thousand acacia trees, and pollarded all his locusts. In spite of this state of affairs, the small orchards intermixed with infested trees are not being attacked by the *Icerya*, although they must be constantly brought there by birds.

The red spider is found, but is not on the increase. The black pear fungus (*Fusicladium dentriticum*) was noticed about three years ago, and are this season, according to J. McLaren, the experienced gardener of the Howard estate, much worse than ever before, attacking all kinds of pears. Nothing has ever been done here to combat it.

On July eleventh I visited the valley of which Searsville and Woodside are a part. Through the courtesy of Mr. N. Carnall I was enabled in a very short time to see the most important points in this pretty valley, which is separated from Santa Clara Valley by a low chain of hills. This seems to keep out the dry winds remarkably well. In most places the valley has a deep, rich, black soil, and the eastern slope has a fine soil, rich in mold, while the west slope is more or less clayey. We found a number of small orchards. Morris Doyle has a few acres of deciduous trees—pear, plum, and apple—all doing well, although the *Aspidiotus perniciosus* has infested them badly. He shows good results from the use of brine, strong enough to float an egg.

Mr. W. McNulty, Woodside, has seven acres of apples and pears, and is one of the few in this section who makes his living wholly by fruit growing. The Jones place is one of the oldest, and many interesting trees and plants were found which will be referred to specially. Nearly all kinds of fruits are doing well here, including orange, lemon, lime, walnut, chestnut, prune, apple, etc. The place seems fairly free of insects.

Dr. Tripp has a number of old apple trees, remarkably healthy looking, although some *Aspidiotus conchiformis* are found on them.

The fungus is greatly on the increase here, infesting apples, and has been noticed for the past three years. Codlin moth prevails to an alarming extent. Mr. McNulty used bands, put ashes about the trees, and has sprayed with whale-oil soap. At the time of my visit it was yet too early to judge as to the efficacy of these applications.

SANTA CLARA COUNTY.

Passing along the county road from Mountain View to Santa Clara, I first stopped at the orchard of Mrs. Butcher, which consists chiefly of apples, plums, and cherries. This was the first orchard I found in this vicinity where apple trees were banded. In spite of the close attention given to this system, the worms, last season, were very numerous. Indeed, the codlin moth seems to be the pest most greatly troubling the fruit growers of Santa Clara County. The orchards in this section including Captain Dunn's cherry, apricot, and young Winter Nelis orchards, appear to be comparatively free from pests. The cherry and apricot do well in this locality.

Section embracing Cupertino (Stevenson Creek), Saratoga, Los Gatos, toward Santa Clara.

On two different occasions this section was visited, once in passing from Los Gatos to Santa Clara, and again on a trip from Los Gatos to San José. In this section lie some of the finest and best kept orchards in the valley. Most of them are young, but several large orchards, such as that of Mr. H. Hutton, are old enough to yield good and regular crops. They are of the Languedoc variety. In many places hereabout the almond seems to do exceedingly well. Among the flourishing ones is the young orchard of Mr. Harrub, whose four-year old trees are heavily loaded with almonds. Apricots and plums do remarkably well, and are planted largely. The orchard of Dr. Handy, like many other prune orchards, is on almond stock, and this seems to be very congenial to the prune in all the gravelly soils that are naturally well drained, and no doubt, owing to the peculiarity of the soil, comparatively little damage was done by the unfavorable weather that prevailed so generally last year. At the fine orchard of Mr. S. F. Leib, near Stevenson Creek, we saw an ingenious grader (on the plan of the fanning mill) at work, separating the prunes into two grades of sizes. The orchards in this section are comparatively free from any scale insect, some few scattering cases of the *Aspidiotus perniciosus* being seen, but they have, in most cases, been treated so radically as to show that their extinction may be considered a comparatively easy matter. A most serious pest here is the *diabrotica*. In combination with certain *coccinellæ* they are especially troublesome, devouring the ripe fruit, cherries in particular. On the almond the red spider also is a serious pest, but is kept down successfully by sulphur washes dissolved in soap. Some fine, large apricot orchards, *e. g.* that of Judge Myrick and Mr. Beaver, are in fine order and yield well. The varieties planted are, chiefly, the Royal, and the large early.

A visit was paid to the Quito olive ranch, the property of Mr. Goodrich. The trees have lately become pretty badly infested with black scale. It was formerly held in check by spraying, but by neglecting that work one season the scale increased very much. At the time of my visit they were spraying with whale-oil soap. In addition to this, afterwards they tried sulphide of soda. The olive flourishes here; its only drawback is the scale.

Santa Clara.

Mr. A. Block's orchard, near Santa Clara town, consists of apples, pears, plums, peaches, etc. He irrigates and manures his orchard heavily, and produces generally large crops. His pears do exceedingly well. A great many are grafted on quince and are only eight feet apart. Among the varieties grown are Beurre, Clairgeau, Beurre d' Anjon, and Danas' Hovey. He condemns Beurre gris d'hiver nouveau, a pear recommended by me, and has abandoned Doyenne d'Alençon, because it does not bear. Here the *Aspidiotus perniciosus* is being fought constantly, but the trees being very close together, it is hard to reach them all. Our observation is, that of cherries, the Napoleon Bigarreau suffers very seriously, where the Black Tartarian is but little affected.

A treatment of peaches affected with curly leaf, attracted my attention. Trees not subjected to this treatment were in a very poor condition, while the others favored with it were in fine healthy bearing. No doubt some day we shall hear from Mr. Block on this subject.

The section west of Santa Clara was visited, the young orchard of Mr. I. A. Wilcox being my objective point. His chief crop has been strawberries, and although he is irrigating considerably, his trees seem unaffected by water, and but few dead ones can be found. The prunes are of good size and quality, and are grafted on Myrabolan stock. The pears are large for their age and are doing remarkably well. *Aspidiotus perniciosus* and the *A. rapax* are found in the older orchards, and young orchards are more or less infested. Of pears, Mr. Wilcox grows Beurre Hardy, Winter Nelis, and Bartlett.

Section south of Los Gatos—Union District.

In this section there are less orchards than north of Los Gatos. We visited the Kennedy Brothers' nursery. The greater part of this land is devoted to vines and less to trees. As a rule, apples do not flourish. Pears do well and are of fine quality. At the place of C. Yoco, we found a great variety of trees doing well—chestnut, guava, orange, lemon, lime, and olive—though they are all infested more or less with the black scale. The climate of the hill region is warm and free from frost, and irrigation on the gravelly soil is a great help to many trees. The olive undoubtedly would grow well without irrigation, and find here a congenial climate. At the place of Mrs. E. Arnirich, I found a number of interesting trees, such as the carob, many varieties of pomegranate, and of fig, the latter, unfortunately, suffering from water so that the fruit was dropping off prematurely. We spent also a short time looking over the fine place of Mr. Haines. The English walnut is planted here, but with what success, as regards bearing, we could not as yet judge; the trees looked healthier than most others in the vicinity. In this section the *Aspidiotus perniciosus* does not prevail to any extent.

The Willows.

A day or two was spent in this section for the purpose of studying how serious the pernicious pear scale really had proved here, whence the insect is supposed to have spread. Although we found many old trees, as well as young ones, badly infested, the energetic measures, sprayings, etc., have so subdued the insects that it is only in neglected places that the scale is really bad, and there is undoubtedly an increase of predacious insects keeping them in check. On this point, I have dwelt in my bulletin on the ladybug, and shall discuss it hereafter in my report on various insect pests also. Here, on good, suitable soil, trees of nearly all kinds do well without irrigation. At a certain age, when getting into full size, cherries planted in land underlaid by a cold, stiff soil show a giving out, thus forming a striking contrast to those growing on suitably deep, black, gravelly soil.

In various parts of Santa Clara County the *Icerya*, or cottony scale, have existed for a number of years, and has of late years become badly scattered in the gardens of San José. This season a large number of locust trees infested with it have been cut down, but the pest finds harbor on the evergreen in the gardens, and sufficient attention is not paid to its suppression. During the short time of the employment of a quarantine guardian, Mr. J. Britten, considerable cleaning was done, but his employment ceased too early to do sufficient good in this line.

Santa Cruz Mountains.

A visit to the fruit-growing section of the Santa Cruz Mountains was of considerable interest. Here the pernicious scale is found in few places, and, owing to the more or less isolated position of many orchards, ought, by proper measures, never to become anything very serious. More trouble has been caused by various fungoid diseases, which, under the general name of blight, have been frequently reported. Different species of fruit have gradually become subject to the disease. The apricot can no longer be considered a safe crop, and peaches have suffered much lately where they used to be considered a reliable bearer. Some of the trouble is undoubtedly due to the gradual clearing away of the trees indigenous to the country. Still the various germs of these diseases have not unlikely been brought with trees, and favorable conditions have spread them. Unless counteracted by some means, these germs will stay and will always prove more or less destructive. As we intend to devote a chapter to the different diseases and their remedies, we shall not enlarge upon this here, speaking rather of the section generally.

The red spider is not found to any troublesome extent, but different parties have reported its disappearance from places formerly badly infested. Plums, as a general thing, do well—French prunes exceedingly well. All show the presence of shot hole fungus.

Of cherries, the Napoleon Bigarreau is the safest for bearing. Apple growing has been one of the most reliable pursuits, but, owing to the so called blight, certain varieties are being discarded and others substituted. The yellow Newtown Pippin and the White Winter Pearmain, as well as the Skinner's Seedling, suffer much. Gravenstein, Jonathan, and Rhode Island Greening, as well as the Fall Pippin and the Hoover, seem to be the least affected of all.

So far, figs have not proved a success; but olives are doing well, and, with proper caution against the black scale, will undoubtedly do well on well drained slopes not exposed to the north wind. The small fruits, as blackberries and raspberries, do well, developing a fine flavor.

SANTA CRUZ COUNTY.

Passing over the summit to Santa Cruz County, we meet with a number of fine apple orchards, most of them too young to be troubled with many pests. But the codlin moth is found in all of the older orchards, as also the woolly aphis. The various fungoid diseases are also showing themselves;

in fact, apples infected were found this season in my own orchard in this locality. Yet, apple growing in this section will no doubt become remunerative, as remedies, we believe, have now been found which will be more fully discussed in the chapter on fungoid diseases. French prunes are planted in several orchards, and yield well. In all old orchards some of the *Aspidiotus rapax* is found, and from importations of trees a few of the pernicious scale have been brought in. In some few localities the tussock moth caterpillar has proved troublesome, eating the leaves of apples and plums; still, it is not feared as likely to become anything very formidable.

Santa Cruz.

The apple orchards of Santa Cruz County are all more or less subject to the woolly aphis, but on rich, deep, moist soil, it does not seem to be doing great damage. But here, as everywhere else, on dry and comparatively shallow soil, it is a most serious pest. Codlin moth, of course, has made its appearance in most orchards, and is being fought in various ways, principally by banding the trees, and by allowing hogs to roam in the orchards to eat the dropped fruit. About the town of Santa Cruz apples, pears, and plums, as well as cherries, do remarkably well, but in the mountains farther back, on this side of the summit, as a general thing, the cherries are a failure. Apricots do fairly well. Peaches, of course, are subject to curly leaf, and cannot, as a general thing, be considered profitable. About the town of Santa Cruz the walnut also does fairly well. Small fruits, as blackberries and raspberries, are at home here, and several valuable seedlings have been originated in this vicinity. The wild blackberry is of very fine flavor, and really is a fruit deserving cultivation.

Pajaro Valley.

My visit to this valley was too short to get any but a very general idea of the condition of the orchards here. Woolly aphis, as well as the codlin moth, is very troublesome, and the black pear fungus affect the Winter Nelis so severely here that this fruit has lately been a failure. The same varieties as cultivated about Santa Cruz and Soquel do well here.

SONOMA COUNTY.

Sonoma Valley.

A good many young orchards have been lately set out in this section, and with them some of the pernicious scale has been disseminated. People there are just beginning to see the necessity for action, and those who have done thorough work, have succeeded in checking its spread. The woolly aphis prevails, but the codlin moth is the most serious trouble, especially in the old orchards, where it is hard to check. Few persons have done any thorough work against its ravages. Bands are placed in some orchards, but in the majority of places none are found. This makes it very hard for the few enterprising men. In one orchard, the canker worm has made its appearance, being there for several years. In this orchard the pernicious scale has become well established, and the owner is so badly discouraged, that he proposes to dig up the whole orchard. This summer, again, the red humped caterpillar is here, but judging from its previous history, it will not become anything very serious. As almost all over the State, here too, red spider is common. Lately, the *Icerya* has also made its appearance on some locusts, but, by the prompt action of Mr. O. B. Shaw, it was exterminated. It was found, however, in the hotel yard of the town on acacia trees. These trees were ordered cut down, and we hope that the further spread has now been prevented.

Most all varieties of fruit (when planted in suitable land), do well in Sonoma Valley. Evidently, some of the land lacks drainage, but even on comparatively well drained soil, there has been here, as in many other parts of the State, a dying out of a good many young trees, especially of prunes, plums, and apricots. The causes, we believe here, as elsewhere, to be chiefly climatic, but the complaint is so general, that we shall devote a chapter to it.

Going from Old Sonoma to Glen Ellen, a good many fine young orchards are passed. Among the older ones, we visited that of Colonel Hooper. A large number of almonds (which had not proved renumerative), were grafted successfully over the Petite prune. A very fine young olive orchard, about ten years old, was in full bearing, but had, unfortunately, become infested with black scale, spread from the orange trees. I noticed, also, a fine and vigorous little grove of Italian chestnuts, as well as pecan, and eastern black walnuts. Some oranges, also, were found here, and doing only fairly well, and, of course, irrigated. Still farther up the valley, towards Glen Ellen, I made a stop at the property of Hon. W. McPherson Hill. Here, even, as far up the valley, the Winter Nelis pears were badly affected by the pear blight. The complaint has been so serious, that like many others, the Buerre Clairgeau has been substituted for it. The saw fly, (*Nematis*) and cherry slug (*Selandria cerasi*) have also been troublesome. A visit to the western part of the valley showed a few older orchards, notably that on the Rixford estate, where olives bearing well were seen; also, jujube trees doing remarkably well. On the adjoining place of Caleb Carriger, quite a number of oranges and lemons are growing, and are doing fully as well, if not better, than any of the deciduous trees; all the latter seeming to suffer from over moisture in the soil. The trees were all infested with the black, as well as the soft orange scale. The codlin moth prevails all over the valley.

Santa Rosa Valley.

Somewhat later in the season this promising valley was visited. But the time was too limited for gaining more than a general idea of the condition of the young orchards. On the heavy lands near the town, several large prune orchards have been set out within the last three years. Here, as in Sonoma, and part of Vacaville, a good many trees had died last winter, no doubt on account of the soil being too wet in the spring. The trees are all on peach, and should be replaced by plum stock. This the owners intend to do, having ordered trees grafted on Myrabolan. The codlin moth prevails here as elsewhere. Scale insects have also made their appearance, but are still only in scattered places. All varieties of deciduous fruit trees are reported as doing well; the peach being of course subject to curly leaf. The Wager peach is regarded by some as one of the best varieties for the heavy lands of the coast.

The region of Sebastapol is very different, the soil being light and sandy, and calcareous. A number of older orchards, especially of apple, are found here.

Besides the codlin moth, the blight has been very serious here, and has caused many varieties to be dropped.

The nursery of L. Burbank was visited and found to be in a healthy condition. Lack of time prevented a visit to Bennett Valley.

SACRAMENTO COUNTY.

Sacramento.

As in the case of all older towns having large gardens, Sacramento has collected most of the injurious insects. In places the *Icerya purchasi* can be found, although the worst places were thoroughly cleansed. I gave personal notice to all such places as I could learn about. But the County having no Board of Horticulture, and no funds for paying anybody, of course there was no guarantee that the people would attend to their duty in that respect. At the Grange meeting held about that time, I succeeded in interesting the members, and the subject of having a Board appointed was to be the topic of discussion at the next meeting.

The pernicious scale, as well as the red orange scale (*A. aurantii*), can be found in various places about the city. Here, as elsewhere, some persons have done good work; others, by using worthless compounds, or by applying good material in a faulty manner, have done nothing but waste their time. Here I found an instance of using on pear trees pure kerosene with success, the trees being unharmed by the oil; trees were dormant, when treated.

American River.

In the large orchard of Weinstock & Lubin, near Mayhew Station, a very successful warfare had been carried on under the supervision of Matthew Cooke. The work being most thoroughly done no insects could be found. Other places less wisely managed, showed the presence in a bad degree of the pernicious scale. Some of the orchards are too closely planted, the branches of neighboring trees thus coming so near together that it is impossible to do thorough cleansing. The fruit produced in this section is of a very superior quality and well adapted for shipping. Prunes, plums, pears, peaches, apricots, and almonds, do exceedingly well without irrigation. At Senator Routier's place we were shown some seedling almonds much less affected by the red spider than the Lanquedoc, near by and around them. At the same place are growing some fine young orange trees and olives.

Sacramento River Section.

Having accepted the hospitality of W. T. Johnston, Esq., in company with him I visited some of the principal orchards of the Sacramento River. The narrow belt of cultivated country stretches for many miles from Richland to Isleton. It has long been favorably known as one of the most productive and paying sections of the State, and so with good reason. Most varieties of trees ripen fruit of fine size and appearance. From here the earliest Bartletts are sent to the eastern markets. Cherries, plums, and peaches are also amongst the first coming into market. Although the peach tree is not considered a very long-lived tree, and not worth the keeping after fifteen years, I saw here some sound trees twenty-five years old, and which, by heading back, might last a longer time. Unfortunately, the proximity to market has brought most of the insect pests. The codlin moth, of course, prevails; but, as nearly all the apple orchards have been taken up, and Bartlett pear trees chiefly remain, the presence of the moth is disregarded by many of the growers, and not considered anything serious. That measures to keep this insect in check would be of great benefit no one can deny; but to enforce a law on this subject here would be a difficult matter.

The pernicious scale can be found in nearly every orchard, from several miles east of Courtland to beyond Tyler Island, and on both shores of the river. The trees being large and old, effective measures have been taken, but by few people; yet more than one has proved that here, as elsewhere, by thorough work the pest can be kept in check. So far no coöperation between the growers has been effected; but we trust that the coming season will witness a step in the right direction. Owing to the close proximity of orchard to orchard the owners, without this coöperation, effective and hearty, will not succeed in keeping clean orchards.

Since writing the above I have made a second visit to the section in the month of June, and was glad to notice a great improvement, many orchards badly infested a year ago being comparatively clean.

YOLO COUNTY.

At least as far as our investigation went, the position of this county, bordering on the Sacramento River, may be said to be substantially in the same condition as the section just spoken of.

Davisville.

In this section we visited chiefly the Oak Shade Orchard, the property of Webster Treat. This orchard, with its large variety of fruit, is being well cared for. It consists chiefly of apricots, peaches, Hungarian and French prunes, and pears. The plum aphis attacked the plum trees severely, and to prevent their further work, whale-oil soap and sulphur spray was used, killing them out quite thoroughly; still, not before the foliage of trees had suffered considerably. Applications against these insects should be made in a very early stage of their development. We have observed orchards in Woodland and elsewhere, where the trees were cleansed of aphidians by use of their natural enemy, the syrphus fly, the trees cleansed in this manner looking as well as those cleansed by spraying processes. The modes of preventing the ravages of the codlin moth were many; in fact, all that could be tried, including lights, spraying with whale-oil soap and sulphur, London purple, Paris green, picking off infected fruit, and banding. The results seemed quite favorable, but, as Mr. Treat writes me, are not quite satisfactory. The saw flies, appearing abundantly early in the spring, were killed by the whale-oil sulphur wash. So far, the pernicious scale is not present here in any quantity; indeed, I did not discover it in this vicinity. Red spider here, as almost everywhere else, threatens the almond crop; but is kept in check by whale-oil soap and sulphur. The quality of the fruit, especially of pears, produced in this section, is very fine. Easter Buerre, Duchesse d'Angoulême, and Bartlett are among the chief ones.

Woodland.

This flourishing section is not, as yet, greatly devoted to fruit growing, the three oldest orchards being those of F. Jackson, of R. B. Blowers, and of the Briggs estate, where we found most of the deciduous fruits growing well. Olives are also planted, and in a good many places orange trees can be seen bearing fruit. Figs here, as in nearly all the interior counties, do well. With the exception of the codlin moth, the region so far claims to be free from any enemy to the trees; though the peach moth, too, very troublesome in the adjoining county of Solano, is showing itself. Apricots and prunes have been planted largely, and both produce a superior article of fruit when well cultivated and cared for. The latter were very much troubled with plum aphis; but here, as in many other instances, the syrphus flies come to the rescue and exterminate it. Irrigation is practiced to some extent, on the higher land. On the road to Cache Creek, some fine young orchards are found, in as good health, save the occasional dying of trees—the peach and apricot—as may be seen in any part of the State this year. Peaches and apricots, chiefly, are planted here.

Cache Creek.

The Card place is on Cache Creek. A number of trees were dying here. Mr. Card attributed this trouble to the black knot, which he claims they had from the nursery. Trees develop very rapidly, and peaches bear heavily; though this year, as has been the case in other parts, the yield has been only partial. On older apple trees the woolly aphis was found. With the exception of this, the locality seems blessed with immunity from pests.

Winters Section.

In the immediate vicinity of Winters, but especially close up to the foothills, is a belt from which, with the exception of one locality in the State, the earliest fruit is sent to market. Apricots, peaches, pears, and apples come in early. The last named, greatly subject to the moth, is now being supplanted by other things. Figs are profitable, yielding as much as three crops. Here, as well as in the adjoining county, the peach moth has been very troublesome. So far, only sporadic cases of pernicious scale are found, and these, no doubt, will be stamped out by the owners.

SOLANO COUNTY.

The section bordering on Putah Creek, and tributary to Winters, is much of the same nature as the latter.

Here we find some of the oldest and most interesting orchards, where nearly all the fruits of the temperate zone, as well as many of the semi-tropical, are raised. Especially can this be said of J. R. Wolfskill's place. In the same orchard with pear, plum, peach, and apricot we find the orange, olive, and date, the last named having more than once ripened fruit. Many a problem of horticultural importance has been settled in a quiet way by Mr. Wolfskill, long before it had agitated the public mind. For instance, vines were here grafted in phylloxera proof stock, and have withstood the ravages, while others long since have perished. Owing to the dry atmosphere here the olives are not affected by the black scale, and without doubt they are the largest trees for their age in the State. So far, no scale insect has invaded Mr. Wolfskill's place, although it has, unfortunately, made its appearance in neighboring orchards; but we trust that by thorough measures it will be stamped out of existence.

Pleasant Valley.

Like the region about Winters, just spoken of, this valley furnishes the earliest fruits for the market. Nearly all the available land in this narrow valley is devoted to fruit culture, even some of the steepest hills being cultivated. Apricots and peaches are the fruits most extensively cultivated, but different varieties of pears, as Bartletts and Winter Nelis, also come in for a share of attention. This region, as well as the adjoining part of Vaca

Valley, is remarkable for its early fruits—peaches and apricots. Also, for the latest Bartlett pears. The phenomenon has been explained by W. W. Smith, of Vacaville, and his seemed to be the most rational theory. In midsummer, owing to the very warm weather, there is a sudden stoppage in the growth of the pear trees, the moisture evaporating very fast; the pears also cease to grow. By return of cooler nights and days, the moisture, of which there is plenty in the deep, rich valley land, commences to rise, and with that the growth of the pears begins also. The pears are, in consequence, among the latest sent to the San Francisco market. The Winter Nelis on Mr. Thurber's place are among the healthiest trees of the kind I have seen, and the fruit develops its highest quality; also being a good keeper. The codlin moth is an unwelcome guest, and has caused the inventive genius of a resident here, Mr. Thissel, to produce his codlin moth trap, of which a good deal has been said, and to which I shall refer later. The so called peach moth, or so called strawberry root borer (*Anasia liniatella*), is on the increase, and in some instances fully one half of the early Crawford peaches were infested. This pest, according to former statements, has been known in this locality for sixteen years. The pernicious scale, so far, has not found any lodging place, the few that appear from time to time being promptly stamped out. The red mite, or spider, is abundant, and associated with it is often found a thrip, and without the statement of Mr. Thurber, an experienced horticulturist, to the contrary, I should certainly consider this latter very objectionable. According to this gentleman, this thrip has been known in this county for many years, without visibly affecting the fruits. Time here, as at other places, being limited, I could not visit the many places of interest. Along the hills here, as is the case in all the valley, there is above the valley a thermal belt, where the frost is very light, and oranges, limes, and lemons are cultivated and doing well. The olive would do remarkably well on the hills here, judging from the few specimens seen here. Owing to the dry atmosphere, the black scale will never be troublesome, I believe, even if carelessly introduced at some time, and as the section is well sheltered from the north wind, no danger of damage to the blossoms from this source need be feared. The fig is perfectly at home, and some of the largest trees in the State can be found here.

Vaca Valley.

As we pass from Pleasant Valley to Vaca Valley the valley widens very sensibly, and the temperature also lowers. Fruits are not so early; but such varieties as the cherry, for which the upper valley is considered too hot, develop early, and to perfection. At the well-kept orchard of W. W. Smith we see the low goblet form of pruning practiced to perfection; and a glance at the healthy trees must convince any one that the low training, at least for the cherry, is eminently necessary to the sound development of the tree in any warm section. An immense number of young fruit trees have been planted throughout the valley, and so far most of them have done very well, although in places, owing to the want of drainage, a number of trees have been killed. Apart from these, others have died, this loss being occasioned chiefly by the general conditions of our peculiar season; indeed, it may be attributed to some very low fungoid form. Wherever the soil is sufficiently well drained the stone fruits do well. The peach, in particular, reaches fine size and flavor. No insect disease of the scale kind has made any serious inroad. Still, the pernicious scale exists in sufficient quantities to infest a large area, unless diligently fought. Considerable exertions have been made to stop its spread, and it is to be hoped that it is accomplished.

An efficient County Board, aided by the fruit growers of the section, could do much to prevent the spread of injurious insects. Unfortunately, the Commissioners appointed some years ago had a very disagreeable experience, and they have no desire to act again. As stated before, the climate grows cooler further down the valley; and when one reaches the town proper he finds it very different from the valley above. This, of course, is well known to the people of the section; but the name of Vacaville has been too tempting, and lands outside of the valley proper, of poor quality, have been improved and planted, evidently with great expectations of fine returns. It is from parts of this section that some very sad reports have come. Much of the land here is extremely shallow, underlaid by a hardpan, and altogether unfit for peaches, apricots, and plums, on peach root, at least. Pear trees are the only trees that have done tolerably well, and we should hesitate to plant even those on some of the soil. It was here that thousands of trees died last winter, owing, in my opinion, chiefly to the want of drainage, this being caused by the impervious stratum underlying the land. No irrigation is practiced in Vaca Valley proper.

We regret that we have not been able to visit the flourishing Suisun Valley, which, in many respects, is a rival to Vaca Valley; for duty demanded that the remaining time should be spent in the southern counties.

FRESNO COUNTY.

This county is one of the youngest counties in fruit culture, yet its production has reached such an importance that its production the last few years has made itself felt very much. With the raisin crop this is especially true. Yet the output of peaches, apricots, and pears has been quite large and the country, as a producer of peaches and nectarines, bids fair to become famous, so immense will be the crop. These fruits here, with sensible irrigation, reach fine size and flavor, and are therefore now sought by the canners. All kinds of deciduous fruits develop rapidly, and perhaps, all except cherries, will, in the right soil and with right treatment, come to perfection. In many localities plums and prunes have not been successful; perhaps chiefly on account of the small mites badly infesting the trees. On the grounds of W. M. Williams we were shown fine, healthy trees, for their size, that had been well loaded with fruit. Unfortunately, with the rapid settlement of the country, insect pests are bound to be brought in, particularly as most of the cultivators were entirely ignorant of the appearance of the scale insects, and no authority was present to prevent the introduction of the pests. The pernicious scale has been scattered badly in this county, and the older orchards of Central and Washington Colonies are nearly all in a bad condition. Individuals have done good and efficient work, and the county Boards have no doubt spurred the people on to do something, and by the coming season will have them thoroughly aroused. The peaches and pears here, as elsewhere, have suffered the most, while the apricots have scarcely been affected. Here, also, as in San José, the *Chilocorus* has put in its appearance, and in the orchard of T. R. Foster has done equally as faithful work as in San José. An enterprising gentleman of the same section, Mr. Sewell, has introduced some of these friends of our fruits from Florida, and they seem to be spreading over his place. The belief that the pernicious scale would not live in the hot interior has been thoroughly disestablished in this and other counties—

Kern for example. One fact, however, should be recorded. In many of the worst infected orchards, we found a great many young scale hatched; but, on close inspection, the greater number of them proved to be dead. Possibly they may have been killed by the intensely hot weather prevailing some weeks ago. For the first time, also, I observed on the pernicious scale, the work of parasites similar to the *Thomocera Californica* which preys on the olive scale. But the cases were but few. On the east side of Fresno the insect is but little seen, and we found the nursery of Mr. Williams apparently free from any noxious scale.

A great deal of damage has been done in the county by want of proper drainage, and if the present condition continues, much more harm will be done. By the exertions of various sensible, far-seeing men—themselves sufferers from the overflow last year—several drainage districts have been started, these promising to be of the greatest benefit to the sections covered by them. Not alone has the want of drainage a tendency to sour the ground, but constant irrigation brings to the surface the alkalies, so abundant in these soils. By drainage, these can be carried out of the soil instead of accumulating. Outside of the flooded district, embraced in the Fresno Colony proper, are many orchards already suffering from the same cause. By the development of wet rot, the wine grapes, as the Zinfandel, show it. This complaint is growing quite common, and I have not the least doubt that the many mysterious dyings of trees, are due principally to water or alkali.

SAN JOAQUIN COUNTY.

About the vicinity of Stockton is the only part of this county that I have visited. No very large orchards are found here, although the climate is well suited to many kinds of fruit. The soil, in many places, being of a heavy character, is well adapted to pears, but the French prune, planted here quite extensively, would do better on plum than on peach root.

The red spider, or mite, seems to be more persistent here than in any other place I have visited—a fact I am at a loss to account for. The pernicious scale has also found an abode here, but has not extended as far as the nursery of Mr. Clowes, which seems to be in a healthy condition, save for the presence of the ubiquitous red mite.

I regret that time did not permit me to see more of this fertile section, but I trust that the coming season will give me an opportunity for further acquaintance in that direction. The section has an able and good Commissioner in Mr. Robinson, who has done his best to wake up the energies of the people against the various pests.

MERCED COUNTY.

The only part of this extensive county to which I paid a visit was the Buhach plantation, situated eight miles west of Merced. Like the Fresno colonies, it is reclaimed by water from a sheep pasture. The interest and prominence which has been given to the pyrethrum as an insecticide naturally moved me to pay the place a visit, on which occasion I might observe the conditions of soil and climate for which the plant is adapted. The soil is of very sandy character, so sandy that when dry it is liable to drift. But with irrigation a few times in the year, the plants do well. The pyrethrum might be grown in many parts of the State, and, if not a panacea against the insect enemies, it is a good insecticide for all kinds of caterpillars, saw flies, aphis, and soft scale, but must not be expected to kill any of the armored scales. Used as an alcoholic extract it has most effect. The large nursery of the plantation seems to be in healthy condition as far as regards insects. For lack of time, it was impossible for me to visit the Merced River section, in which I understand some very fine, large orchards exist; in fact, I have had more than one opportunity to test their fine peaches. The fruits about the region of the Buhach plantation are, as in such parts of other interior counties, very fine. The fig is excellent. I saw here a fine, large specimen of so called Adriatic fig, originally introduced by the late N. G. Milco. The apricots of this plantation have also suffered in a manner similar to those in other sections before recorded. A number have died or are dying. All these are on peach root.

TULARE COUNTY.

My stay in this fertile county was also shorter than I wished, and my visits were confined to the Visalia section merely and to the lands immediately west of Tulare City, including the Morton ranch.

Visalia.

In this section the orchards of any extent are few. The largest one is that of Mr. J. W. Briggs, embracing one hundred and twenty-five acres of peaches, plums, prunes, and apricots. It was planted three years ago, being now in its fourth growing year. The growth of the trees, particularly plums and prunes, is something astonishing. These latter were loaded with fruit, which, curiously enough, were not ripe by August twenty-fourth. The yield of some of these trees has since been recorded by Mr. Briggs.

It is a curious and remarkable fact that the plums, prunes, peaches, and pears, not alone here, but in all the irrigated sections in the central and southern San Joaquin, are much later than even in the Santa Clara Valley. For instance, the Petite prunes in Santa Clara Valley by the twelfth of August were dead ripe and being dried in orchards on Stevenson's Creek. Twelve days later, on my visit to Visalia, the same variety would not be ripe for a week further. The same condition holds good in Kern County, also, where I found the Bartlett pears just picked. Yet grapes are not affected in the same manner; on the contrary, being ahead of those in the Santa Clara Valley. Of course, it is natural that the warmer regions should produce the earlier fruits, but here the case in several instances seems to be reversed, for the average summer temperature in Fresno, Kern, and Tulare is very much higher than in Santa Clara Valley, and yet some of their fruits ripen more slowly than the same kinds in cooler places.

The various orchards hêre are not irrigated artificially, but the soil about here seems to be naturally subirrigated. Although the natural vegetation here is white oak and the grass salt grass, generally supposed to indicate alkali, yet the fruit trees, so far, do not show any sign of it. In the immediate vicinity of Visalia the red pear scale was found, but so far does not appear to have spread greatly, although an old orchard here is very much affected.

West of Tulare City.

The principal orchard of this section is that of Messrs. Paige & Morton; this consisting of peaches, apricots, pears, and prunes. The principal trouble in the insect line so far, has been confined to red and to the yellow mites. These have not been checked in time, and have killed the foliage of many of the pears and prunes. Besides this, the pears have suffered from a hot wind which blew during the month previous, and which here, as well as in certain places in Fresno, has blasted the foliage on the east side. Canning was at full progress at this place—peaches, plums, and nectarines being the principal fruits used. All the work was done by white boys and girls, under the supervision of Richard Wheeler. Although the place has about two hundred acres planted in fruit trees, most of the fruit canned was purchased from the Mussel Slough section, a region my limited time did not permit me to visit.

Irrigation is necessary about Tulare, and artesian wells supply abundance of water.

KERN COUNTY.

This county, perhaps, has been the last one in which fruit growing, as an industry, has been contemplated. Yet, through the enterprise of a few individuals, it has been proved that the much neglected county has capabilities second to none of the southern San Joaquin counties; at least in the way of peaches, pears, plums, and prunes. To my mind, the principal difficulty lies in the necessity of drainage, in conjunction with irrigation. Through the courtesy of the Horticultural Commissioners, Messrs. Maul and Burr, I was enabled to see in a comparatively short time, some of the most important places. At the gardens of Mr. B. Brower, the development and yield of nearly all the deciduous fruits were demonstrated to be exceptionally large; and his careful management had, so far, prevented any insect pest to get a foothold there. Unfortunately, here in a county very new in fruit culture of any extent, the pernicious scale has not failed to find its way; and for the few years at best that it can have been here, it has managed to take a good foothold. The Commissioners, who have proved themselves very active, have had much difficulty in rousing certain people to exertions against their insect enemies; yet there has been a great deal of work done, and wherever thorough treatment has been administered, the trees have been cleansed of the scale. They have used soda, lye, and potash, at the rate of one half a pound of each to five quarts of water. In some badly infested orchards the pernicious scale has spread to nearly everything, including figs, apricots, and even poplar trees. And yet, with thorough measures, I repeat, that it could be stamped out here as well as anywhere else. From their experience here, the County Board is unanimous in the opinion that the Commissioners should be vested with the authority to put places under quarantine, and to maintain it when necessary, in order to prevent the spreading of the insect again, through infected fruit. I think, also, that a clause of this kind would be of great importance in counties having scattered orchards, and would prevent the spread in many new sections where only an orchard here and there is not clean.

SANTA BARBARA COUNTY.

My visit to this county was confined wholly to the coast section, which is the part by far the best known, and, until recently, the only part, as far as I am aware, where fruit culture on any large scale has been tried. The climatic conditions of this part of the county are of such a character that a number of the semi-tropical fruits, such as guavas, custard apple, etc., can be here cultivated to perfection, besides the more hardy ones, as the orange, lemon, and lime. The olive, long cultivated by the Mission Fathers, was here, for the first time, subjected to extensive cultivation, and through the exertions of Mr. E. Cooper has won a name for Santa Barbara.

The English walnut (*Juglans regia*) has also for a number of years been under extensive cultivation, and seems to yield one of the most reliable and profitable of crops of the section. All the deciduous fruits thrive and produce fine fruit in great abundance; but they show too great a tendency to precocity and overbearing, which, if not counterbalanced by vigorous and systematic pruning, will cause early decay; especially is this the case with the plums and prunes. The peculiar conditions of the past season have cut the crop of this county, as of other southern counties likewise, short of deciduous fruits. A discussion of the causes of this failure I have left for another paper. A great many plums, apricots, and peaches have died here this season.

The great variety of ornamental plants and useful trees cultivated here has naturally brought with it the parasites, and the genial atmosphere is not very apt to disagree with them, hence we find the olive subject to its true enemy, the *Lecanium*, or *Coccus olea*, this latter scale insect affecting a greater variety of trees than I have seen in other places. However, it is really persistent on the olive only. In the gardens of Santa Barbara the *Aspidiotus aurantii*, red orange scale, the *Lecanium hesperidium*, and of late the *Icerya purchasi*, cottony cushion scale, have made their appearance. The latter, spreading all the time, and from inhabiting originally only one orchard has invaded a great many, and unless some very decisive action is taken it will soon spread over this section of the county. After apparently having satisfied themselves that none of the remedies are thoroughly effective, the owners of two of the most extensive orchards are confining themselves to washing off the insects by means of cold water forced through a strong spray. Without entering into details as to the insufficiency of this remedy, I will state that the Los Angeles experience has proved to my mind that the various soap mixtures recommended by the Los Angeles County Commission, and that the mixture recommended in my Bulletin No. 3, would, on smaller trees more easily reached, be equally as cheap, and much more effective, without being of any harm whatever to the trees.

The woolly aphis, here as in almost every older orchard in the State, is more or less prevalent, while the white pear scale, or *Aspidiotus rapax*, commonly infests pear and apple trees. The red pernicious scale was supposed to have been in the county, but I failed to find it. If existing, it must be in isolated places. The deciduous nurseries, those of Messrs. Hooper and Spence, appear free from it; but fruit infested with it is offered for sale at stores, and no special pains taken with the boxes. Thus, we may have to add the county to the long list of those infected.

Carpenteria.

The climate of this charming little valley is, perhaps, milder even than that of Santa Barbara, and fully as well protected as the latter named place. The soils vary, from a clayey to a sandy loam, the latter being that of the valley proper, and is the soil that has made the valley famous for lima beans. The land was originally covered with live oaks and is naturally rich in humus. The walnut has been planted extensively here. So far, Carpenteria can boast of having the largest walnut orchard in the United States, and is, by far, the most important fruit crop.

Peaches, apricots, apples, pears, and prunes do well, but the prunes are very short lived, and the tendency to overbearing is great. Winter Nelis pears reach large size, but are not good keepers. A peculiar mode of training apple trees, different from any I have seen, is practiced by some growers. This mode allows but little trunk, and the branches hang down, after the manner of the weeping willow. The short trunk is naturally developed by allowing young, slender branches to become overloaded with fruit. Certainly, the picking is made easy.

A very thorough search for the codlin moth failed to reveal its presence; and the section may, therefore, lay claim to being free from, at least, that pest.

Oranges, limes, and lemons are planted in every garden, and are all infested with *Lecanium oleæ*. Some have the *Lecanium hesperidium*, and also, what appeared to be the *Aspidiotus rapax*, is found also on the lemon. So far, this section can be counted free of any serious pest, and we hope that Carpenteria's people will take care that it will remain so.

VENTURA COUNTY.

This county, without doubt, is an exceptional one, both as regards climate and soil. The very fact that lima beans can be cultivated on apparently dry hills—back of Santa Paula, fourteen miles inland—indicates in a great measure the remarkable soil, which the natural cuts or berenkas, as they are called in that section, show to be of immense depth. From San Buenaventura to Santa Paula, orchards of apricots and walnuts have been set out on a large scale, and are in fine condition, although there has been here, as elsewhere, a dying off of a small portion of apricots.

Very few insect pests of a serious nature, so far, seem to have found their way here. The codlin moth, according to Mr. C. B. Blanchard, has not been seen yet. *Lecanium oleæ* infest the oranges quite commonly, and the apricots near by them, are also subject to this. This, besides the *Aspidiotus rapax*, are the scale insects we have seen here. At the nursery of Mr. Ainslie, we found many varieties of fruits, including a great number of apples. Of these, as in all the southern counties, the Winter Pearmain does the best. According to Mr. Ainslie, the Yellow Newtown and the Rhode Island Greening are among the most suitable to the climate. The season here, also, for most of the fruits, had been very unfavorable, and the crop of all deciduous fruits was short. A few seedling peaches of good quality showed good bearing propensities, being but little subject to curly leaf, a disease which peaches in no location near the sea seem to be exempt from, but local seedlings are invariably found to resist it better. In fact, there are many instances of the kind known, even in the unfavorable climate of San Francisco and West Berkeley. Figs also were found in many varieties on the Ainslie place, all doing well, as it seems. bearing profuse crops.

The culture of the citrus fruits has been undertaken on a large scale by Mr. C. B. Blanchard, at Santa Paula, and so far has not encountered any enemies more serious than the black scale, the orchards otherwise being in fine condition. The lemons are heavily loaded with fruit, and the orange trees are gradually coming into bearing. Frost about Santa Paula is extremely rare, and so light that the lime trees are never hurt, while the pear shaped guava, a much more tender fruit, has, in places, passed through several seasons uninjured.

The condition of things about Nordhoff I had no occasion to learn, but in passing through the whole length of Santa Clara Valley, on the way to Newhall, had a good opportunity to observe the gradual change from the coast climate to the drier interior.

Stopping for refreshments at a farm, about fifteen miles from Santa Paula, I was much interested in examining an old orchard on the place. The orange does well here, though it is at some elevation and quite sharp frosts occur, these having the tendency to keep the deciduous fruits in better health than they seem to be near the coast. In the drier air here the orange trees also look much brighter, owing to the fact that the black scale does not thrive so well here as in the moister atmosphere of the coast. We regret that no arrangement had been made that would allow for stoppage at the Camulos, where both orange and olive are cultivated. Irrigation, except on the moist bottom lands, is considered necessary in this region.

LOS ANGELES COUNTY.

City and Vicinity.

Having been invited by the Los Angeles nurserymen to pay a visit to their nurseries, to clear them from the suspicion of being infested, especially with the *Icerya purchasi*, or cottony cushion scale, I devoted some time to the work, hoping that by so doing the people in general might be rendered a service. As regards inspecting a nursery, I should like to state that to examine one so thoroughly as to justify an absolute statement as to its complete freedom from injurious insects, would require ten times the amount of time that is given to the Inspector of Fruit Pests.

In passing judgment on the condition of any given nursery, I have always taken pains to ascertain the condition of the neighboring gardens and orchards, as well as of the nursery. If all these places examined are free from contagious insect pests, and the nursery stock older than one year is found to be in the same condition, I conclude, after a general examination of the younger stock, that the nursery is in a healthy condition.

The nurseries of Milton Thomas, located on Jefferson Street, are distant at least one half mile from any orange orchard found infested with cottony scale, and he cultivates deciduous trees only, which, with the exception of walnut trees, are very little subject to this pest. The most serious insect pests that I was able to discover in the neighboring orchard trees were the black scale (*Lecanium oleæ*), the white pear scale (*Aspidiotus rapax*), and the so called woolly aphis, unfortunately too well known in all apple orchards of the State. The young nursery stock appeared clean and in healthy condition, the pear slug being the only enemy found upon them.

The nursery of Andrew Schneider, consisting also solely of deciduous trees, is on the road to Florence, and beyond the belt of orchards infested with *Icerya purchasi*. His trees are remarkably healthy and vigorous. The large nurseries of Thomas Garey are located in an entirely new section, near the Sepulveda Station, miles beyond any orchard known to be infested with the *Icerya purchasi*. With the exception of a few olives his nursery also consists of deciduous trees, all in most vigorous growth, and appear clean from any insect pest.

The winters in this section are too cold for young orange trees. As a consequence there are no orange trees. The cottony cushion scale is by far the most serious enemy to fruit growing here. But, fortunately, so far, it has been confined to a portion of the City of Los Angeles, where, by active measures, it is kept in check, and has been prevented from spreading to the southwest. The county has been thoroughly organized against the pest, and from the Commissioners' report one can learn about the amount of work accomplished.

The most common scale insect is the *Lecanium oleæ*, which, without exception, infests all citrus trees and olives, and is found on many others, often on the apricots. Less common is the *Lecanium hesperidium*, soft scale. It is primarily due to these two latter scales that all orange trees in the vicinity of Los Angeles present such a black appearance. The black smut fungus follows invariably, and grows on the scale insect excretions. As these two pests are easily kept down, with soap washes, it is rather strange that the Los Angeles people will tolerate these pests. In a number of orchards is found the *Aspidiotus aurantii*, red scale of citrus fruits, but until lately no war has been waged against it. The orchards near town are infested with the omnipresent *Aspidiotus rapax*, white pear scale. But lately the very objectionable *Aspidiotus perniciosus* has reached the county. It should receive as rigorous a persecution as the *Icerya*.

Pasadena and San Gabriel Valley.

In the orchards of Pasadena the cottony scale has also made its appearance, but owing to the persistent efforts of the Inspectors it may be said to be under control. The work done here shows that even this pest could be exterminated, but only by persistent effort, and by the full coöperation of all concerned. *Aspidiotus aurantii* is also found here. The black scale interferes seriously with the growth of olive trees, these having been planted largely in certain places here.

Farther out, in San Gabriel Valley, where citrus culture is extensive, the aspect is much more serious. Several large orchards here are infested with both the cottony cushion, the black, and the red orange scale, and present a discouraging appearance. A great deal of money has been expended against these pests by most of the owners, but it seems to have availed but little. A few undaunted persons, Mr. A. B. Chapman, for instance, keep up persistent efforts, and so manage to save their crops. The several washings, instead of hurting the trees, as stated, have had a decidedly favorable effect upon the general appearance of the fruit and upon the trees. And this is owing to the killing of the black scale, with its invariable follower, the fungus. With our present knowledge, the two first scales, in my estimation, can never be eradicated by spraying, except on very small trees or on trees whose tops have been removed, an operation an orange grower possessing thousands of trees hesitates to do.

It is to be deeply deplored that such a condition has been allowed to overtake a portion of this most beautiful valley, in which, side by side, almost all kinds of fruit can be grown. Lemon culture here is especially profitable, the lemon here being of very superior quality, the fruiting season lasting longer. The English walnut does well, and in ordinary years the deciduous fruits do well. In the belt along the hills, embracing the Sierra Madre Villa, locations are found totally free from frost, where all kinds of tropical fruits, such as chirimoya, pear-shaped guava, and others, would do well. It also deserves to be put on record that in this valley the Spanish cork oak has come into bearing, being, as far as I know, the first in the State. The capabilities of the San Gabriel Valley are great, and with the energy that is pushing everything here, especially, we may hope for a thorough coöperation in exterminating, or at least in checking, the spread of the insect pests.

Tustin City and Orange.

A visit to these places revealed a far more serious state of affairs than was at all expected. The *Icerya* has not reached this beautiful section; but a species of red scale, evidently different from the *Aspidiotus aurantii*, has taken possession of many orchards, and its effects are so serious that the trees finally succumb, and already many orchards have been uprooted. Fortunately, raisin growing offers good inducements, and so has largely taken the place of orange culture. This peculiar red scale has been known in Orange for many years, although at Tustin it is only lately that it has made an appearance, its dangerous character at first being unknown, and the insect being mistaken for the lemon peel scale.

We found the more enterprising people spraying their trees with various remedies, potash in water—eight pounds to one hundred gallons—being used by some, and a soapy mixture, furnished by Mr. Lelong, being also used. It was still too early, at the time of my visit there, to see the effects of these washes. There is no question but that by washes of this nature the insect can be kept down; but owing to the extraordinary difficulty in covering every infected particle, I doubt that the insect can be exterminated, unless the trees are severely cut back, and the bare trunk cleaned, as this species, unlike the one found at San Gabriel, covers the branches completely, causing them to die. In no section, perhaps, could active coöperation in fighting the scale accomplish more good.

The Inspector for the district states that, owing to a clause in the law, which makes it necessary that complaint of injurious insects infesting a given orchard shall be made to the Board, he has not attempted to force people to do anything. The pest is so thoroughly distributed that no man can complain of his neighbor without implicating himself. The real state of affairs is, I think, that no one has any faith in any of the advised remedies. However, the people are trying a good many things this season, and so may soon determine the cheapest and most efficient way, and all should accordingly start about it at one time. This red scale is, so far, confined to Orange and part of Tustin City, but is spreading all the time.

The walnut is cultivated about Orange, Tustin, and Santa Ana, and in all this section makes prodigious growth, also arriving early to bearing age. They are not affected by disease. The mild climate makes cultivation of limes and lemons very profitable, while bananas perfecting their fruits are frequently seen. Most deciduous trees have been a failure this season. Cherries, as in most of the southern coast sections, are not at all to be depended upon; nor do plums, as a general thing, do well. The French prune shows a tendency to overbear, and consequently run out soon. Apricots have generally proved satisfactory. Pears and certain varieties of apples do well. The *Aspidiotus rapax* infests these, and the *Lecanium oleæ* is quite common. The codlin moth, as yet, does not appear to have reached this locality.

A visit to the Ford nursery was made. It contains, almost solely, deciduous trees, among them a large assortment of walnuts. The stock looks healthy, and, with the exception of the red spider, appears clean. Examination of neighboring trees reveal the presence of black scale only.

My visit to the Santa Ana Valley nursery was too short. I could learn nothing more than that the red scale, so far as known, has not appeared in the neighborhood, this being in reference to the deciduous nursery—the orange nursery was not visited. On my visit to Pasadena an examination of the Byron Clark & Co. nurseries was made. They consist of young orange and lemon trees. The nursery is east of the town, and surrounded by deciduous trees. The trees are clean from cottony scale, and look bright and healthy.

SAN BERNARDINO COUNTY.

Within the last few years this county has developed so rapidly that a few days' stay can, of course, be devoted to the most important sections only, and even these can receive but a general inspection.

The Town and Vicinity of San Bernardino.

Orchards of deciduous trees have a very healthy appearance, and if it exists at all, no serious insect pest is common to them. The orange is quite subject to the soft orange scale, but as orange culture is not carried on in the immediate vicinity of San Bernardino, the insect is of less consequence there. Passing from the lower lands of San Bernardino to the gradually sloping table lands, we enter into a section where a great many citrus trees have been set out, and many young orchards coming into bearing. In Lugonia orange growing is a success, and the drier atmosphere prevents the black scale from doing any damage. But this variety of scale may be said to be the only one against which the climate may offer a protection. The armored scales, as the *Aspidiotii*, will thrive here almost equally as well as in a moister climate. So far, we believe the promising section of Redland and of Lugonia to be free, but only extreme care will keep them so. With irrigation at Lugonia the pear, apricot, plum, apple, and peach grow well.

Riverside.

Riverside has a well deserved name of being one of the cleanest settlements in Southern California. But it appears evident that its climate alone cannot protect it from the insects; and it stands a fact that even here the pernicious red pear scale has managed to establish itself, right in the settlement of Riverside, brought there, no doubt, on the pear trees which it now infests. It is not to be considered of much danger here, as the cultivation of deciduous trees is not carried on to any great extent, and the insect takes very little to others. We cite the case merely to demonstrate the fact that even here, in the almost pure desert climate, the scale insect will live and thrive. I found right in town on some pear trees a species of scale which I have not been able to determine. It resembles *Aspidiotus rapax*, but is not the species. It has marred and roughened the trees considerably, but has not spread to anything else. The general appearance of the orange orchards about Riverside is good, except wherever the China lemon stock has been used. Noticeable by their sickly yellow color, these trees are easily seen from a distance. On examination it is found that there is an enlargement of the trunk below the graft, and that gum is oozing out of the trunk. The failure of the China lemon stock is well known here, and need not be commented upon for the benefit of the Southern California orange growers; but for the benefit of people in other parts of the State, contemplating citrus culture, it is well to mention the fact. The question of stock for the orange is as important as for any other fruit tree. Without going into any discussion of the various stocks, I shall state simply that a large consignment of sour orange stock from Florida was imported last winter by Messrs. Twogood, Edwards & Cutter, of Riverside. Owing to the presence of many numerous scale insects in Florida, considerable anxiety was felt as a consequence, in Riverside, lest some objectionable addition to their pests might be imported also. As this was a question of great interest, I took pains to examine the various sour orange nurseries. After careful examination I have failed to find any scale of any kind on them—not even the trace of a dried up skin of one. Before leaving Florida the trees were most thoroughly disinfected, and also after their arrival at Riverside, and the trees cut down to the ground. If any one is intending a similar importation, a similarly rigorous treatment would be most advisable.

The bulk of the orchards at Riverside are orange orchards, only a small percentage being lemon, and still less lime. Occasional deciduous fruit trees of various kinds are met, notably the olive, which is of rapid growth and perfectly free from scale, although none of the trees we saw exhibited much of a crop this year.

Figs do well, but are cultivated comparatively little. A fine fig for drying is produced by D. H. Burnham, who finds a ready sale for the fruit, put up in neat packages. Although small, they are equal to imported Smyrna figs. The variety was obtained under the name of White Ischia, but is not the variety generally sold under that name. According to Dr. Eisen, of Fresno, it is the White Marseille.

SAN DIEGO COUNTY.

This county, the last to be considered in this connection, is making rapid strides in fruit growing; and the interior, by the development of water advantages of late, will, no doubt, soon assume great importance. San Diego County is one of very different climates for its different parts, and is properly considered when viewed in this way.

Coast Region.

The region about San Diego Bay is one of the oldest settled places. Here we find some of the oldest plantations of olives, and some date palms are still left at the old Mission. The extremely mild climate makes possible the culture of a great many varieties of semi-tropical fruits. Unfortunately the quality of the soil near the town is very poor and has prevented any planting for profit. Farther over, towards National City, the soil changes, and we find many little olive, orange, lemon, and lime groves, as well as deciduous trees. The last named, if well cultivated and on good deep land, do not need irrigation, as well illustrated at the place of J. L. Griffin. This place we found in particularly good order, no insect, except the olive scale, being found. This scale affects everything almost, and makes it necessary to spray the trees frequently, especially the olive. Mr. F. Kimball made thorough work by heading back the trees severely, and scrubbing the trees with a soap wash, to which we will refer later.

The orange trees when not fully supplied with water, suffer severely from red spider, and everywhere is troubled with the black scale, as well as the soft orange scale. By timely washes with various soap mixtures these are kept down, and in Paradise Valley many clean little orchards of orange, lime, and lemon, can be seen. In poor soil, and especially where it is dry, the apple suffers severely from woolly aphis, and the trees are small and stunted. This coupled with the want of proper pruning makes the trees very short lived. The only scale found infesting deciduous trees is the *Aspidiotus rapax*, which is, of course, particularly upon pear trees. And the pear tree here at certain seasons is found subject to the black fungus, also. The codlin moth, unfortunately, has found its way here, and unhindered is allowed to live in the orchards. As this section is not specially adapted to deciduous fruits, though they can be produced fairly well, this pest is of less importance than in some other parts. However, care should be taken that it be not allowed to infest the interior valleys, where, owing to the colder winters, there are much greater advantages for deciduous fruits.

Along the Sweetwater River is a number of orange and lemon orchards, the latter fruit finding undoubtedly a climate thoroughly adapted to its nature. It was there the various valuable seedlings have originated. Along here are places as well sheltered as any in the State, and absolutely frost free. So mild is the climate here, that the melon tree or carica papaya, a tender tropical tree, has lived for several years, developing to perfection.

El Cajon.

This is one of the largest valleys in the county, and has lately developed very rapidly. The climate is marked by colder winters and it is only on rising ground that citrus fruits do well. The valley is largely devoted to raisin growing, but a number of orchards are in bearing. A large orchard of mixed deciduous trees, not doing very well, illustrates the mistake of pruning too high. Another orchard, not far from the former, exhibits a much more healthy appearance, owing no doubt to the difference in training, this one being low. The pernicious pear scale has managed to find its way into this far off place, but although it must have been present in one orchard at least for seven years, it has not made any headway—for what reason, I am at a loss to explain. Olive culture is successful and profitable, fine specimens for their age being shown at Mr. George Cowle's place. The orchard of Mr. L. Chase is the largest and most important in the valley. It embraces one hundred acres, and without exception the trees are vigorous, the apples especially so, and looking fully as well as any I have seen in Southern California. I think the secret is a little timely irrigation. Oranges are cultivated here successfully, the frost being much less than in the center of the valley. The olive, although subject to the black scale, is loaded with fruit.

San Jacinto.

It being impossible, on a short stay, to visit all the valleys of San Diego, it was thought best to visit what might be considered representative sections. I regret exceedingly that Poway Valley had to be omitted, but the two days a visit there would require could not be spared. The great interior valley of San Jacinto has a rapidly growing settlement, where fruit growing is being quite extensively tried. San Jacinto is an elevated plane, surrounded on all sides by high mountains, some of which are snow clad the year around. Naturally, from the location of the valley, the climate partakes of the desert character of the southern San Bernardino Valley. Nights are cool, days hot, and the wind dry. The upper part of the valley was among the first places to be settled, and some fifteen years ago a mixed orchard was started by a Mr. Webster, now deceased. The orchard is of special interest in the valley, as it gives a fair idea of what may be expected of the various fruit trees. Apples of various kinds were very healthy. The peaches are mostly seedlings, and being rather overirrigated were not of first quality. Winter Nelis were fair for the season. A few orange trees are fine and healthy looking—no trace of scale found on the whole tree. Trees are in a remarkably healthy condition and speak well for the future capabilities of this part of the valley.

In the winter the thermometer sinks as low as 18° in the lower part of the valley. This is also the artesian belt, water here being in great abundance; some seventy-five flowing wells in operation. The natural growth here is cottonwood and salt grass, and in the damp places are large patches of *Yerba Manza*, or *Anemopsis Californica*, generally indicating alkaline soil. It is in this belt that most of the fruit trees have been planted, and the growth has been very good. The greatest output seems to have been apricots and peaches, both well adapted to the climate, the latter especially. With proper drainage, this belt promises to be a great fruit growing district, but unless proper measures for drainage are not soon taken a wet winter will tell very sadly on the trees. Already the alkali has been brought to the surface in spots, and shows its effect on the vegetation.

The greater part of the valley is what is known as mesa lands. Here artesian water, as yet, has not been obtained, though common wells can be had at a depth of thirty feet. The results here obtained without irrigation are really encouraging. It is demonstrated here, by Mr. Warner and others, that by good cultivation nearly all the deciduous fruits can be grown without irrigation. Here are grown peaches, apricots, prunes, almonds, figs, pears, and walnuts, the fig, especially, doing remarkably well. The trees here, as elsewhere in the valley, are free from any dangerous pest. The work of the leaf-cutting bee was the only trace of injurious insect that I observed; but it does not seem to have done harm of any serious consequence. From Fresno complaints of this insect have come, but it is more than likely that it will only be a local trouble, as thorough cultivation, by destroying their underground abodes, will prevent them doing much harm.

Report Submitted at the Meeting of the Board in Los Angeles, April 16, 1887, and Ordered Printed.

PLACER AND EL DORADO COUNTIES.

My visit in these counties fell from the beginning of December to the middle of the month, and my movements were considerably interfered with by the rain. Most of the orchards of Placer lie in a belt along the Central Pacific Railroad, beginning at Pino and running to Auburn; especially are there many orchards between and about Penryn and Newcastle. The orchards about Penryn and Newcastle are nearly all comparatively small, compared with orchards in the valley. The land is mostly rolling, and the soil rather shallow, from one to three feet, underlaid in many places by a syenite rock, familiarly known as rotten granite, which allows the roots of trees to penetrate deeply; it is generally rich in iron, giving it a strong red tint. Irrigation is practiced, with but very few exceptions. Of deciduous fruits, peaches are more cultivated than any other fruit, and seem to be the most profitable. Plums, prunes, and pears also do well, but the former, as well as the peaches, suffer considerable from a gum disease. The *Aspidiotus perniciosus*, brought in on the trees, has been very troublesome; and owners have generally not been active in exterminating them until the last year, when nearly every one has fallen into line. As a winter remedy, caustic potash and soda, one half pound of each to five quarts of water, has been used successfully. Some have used the following: Eighteen pounds of American concentrated lye, boiled with five pounds of sulphur, twenty-five pounds of soap, to fifty gallons of water, and claim good success with this. As a summer wash, some have used home-made soap, and accomplished a great deal of good.

The fig does exceedingly well, bearing early and abundantly, and is undoubtedly one of the fruits best adapted to this section. The apple grows rapidly, comes early into bearing, but is, in my judgment, not adapted to the comparatively shallow soil. Early varieties are, nevertheless, said to be very profitable, and the Astrachams, Gravenstein, and Alexander of these late varieties burn by the hot sun, and fall, also, too much the prey of the codlin moth.

The apricot is by most of the experienced growers considered unsatisfactory. The Moorpark is reported as not bearing, and the Royal bearing well, but much subject to a gum disease, which often proves fatal. Exceptions to this failure of the Moorpark are, however, recorded by Mr. George Kellogg, at Newcastle, who has had very satisfactory results from his trees.

The olive does exceedingly well, both on the syenite and slate soils, and is uniformly free from the attacks of the black scale, which does not seem to be able to live in this section. Only in damp and shady places its presence can be barely traced. Another species of scale (*Aspidiotus Nerii*, or oleander scale) is to be found, however, which I here met for the first time affecting the olive, but have afterwards observed in various places in the northern part of the State. I have met it at Marysville, Newcastle, and Sacramento. Unlike the black scale, this insect attacks the fruit very much, causing it to be arrested in its development, the part on which the scales are seated remaining green. All parts of the tree are affected, but especially the lower side of the leaves, which are often covered with this scale completely. The female of the scale is yellow, and its scale covering is whitish, and seated on the olive leaf is not easily observed, being almost the same color as the leaf. People should be much cautioned against this scale, as it evidently flourishes where the black scale is unable to live. A strong soap solution will kill the scale, but owing to the nature of the olive tree is hard to apply successfully.

Although the olive has been irrigated nearly in every instance, it seems that it undoubtedly would do well without; but the cases shown me here gave me no actual proof that trees had been brought to the age of bearing completely without irrigation.

Farther up in the county, about Auburn, we find several olive orchards, the oldest of these being that of L. A. Gould, the oldest trees being in their seventh year. The orchard consists chiefly of the Picholine, a small olive only the fourth of the size of the Mission, as grown here. This variety is evidently an early bearer and early ripening variety, ripening here about five weeks ahead of the Mission. I found the olive trees here exceptionally healthy and bright looking, no sign of any scale being found. Some irrigation has been practiced by Mr. Gould. The soil is a slate formation and comparatively shallow. Dr. Agard has so far the largest olive plantation near Auburn, some twenty-five acres, most of them in the second year. He has practiced very little irrigation, the first year giving the trees twice, five gallons; this year, being a drier year, three times, five gallons. They all have made a fair growth. The olive, in Placer County, comes into bearing in its fourth year from the cutting, and bears quite considerable at five years. Plantings of olives have been made as high up as Colfax, and they are reported as doing well. About Auburn not a great many orchards of deciduous trees exist, and the planting of apples especially has been discouraged by the presence of the codlin moth. A number of young prune and peach orchards have been set out and are doing well, wherever they have been started with low trunks. The *Aspidi-*

otus perniciosus has not failed to find its way up here, but whenever aware of such fact people expressed a strong desire to exterminate it.

The Orange.

All the way from Pino to Auburn you meet with some small plantings of orange trees, which, with the exception of the soft orange scale (*Lecanium hesperidium*), are perfectly clear. This scale, as has been proved to my mind more than once, will live in a much drier climate than the *Leconium oleæ*, or black scale, which is too common everywhere in moist localities. Although the soft orange scale is always present on the trees in this section, it does not gain on them, and must be considered comparatively harmless. The orange, when planted on the higher and warmer knolls and when well attended to, makes a fine growth. Where water is plentiful the trees compare very favorably with that of any section. The fruit is bright and clear. The orange, like nearly all the other fruits, comes early into bearing, and the trees are allowed to overbear, hence in many instances have a stunted look. This should and could easily be guarded against. The only danger to the orange in this section, outside of the armored red scale, is frost, but if trees are protected the first two seasons, and the warmer knolls and slopes are selected, must be considered safe. To select such sites requires, however, considerable local experience. It is really remarkable to see how well the orange will do, even on shallow soil. One of the most striking proofs of this can be seen at Mr. Silva's and Dr. Frey's orchards at Newcastle.

EL DORADO COUNTY.

My visit to this county was an extremely short one, and really does not entitle me to much of an opinion of the country. The only part I visited was the Coloma and Uniontown section, which lies on the American River. The country was formerly devoted to mining, and is so to some extent yet: and fruit growing was, of course, in those days, with a good home market, more profitable than now; but the quality and appearance of the fruit is such that it has always sold well in any market. A great many apple orchards appear to be abandoned, chiefly owing to the codlin moth. Farther up in the mountains, at Georgetown, however, the moth is said not to have reached, and the winter being a good deal colder, the fruit is of excellent keeping quality. The principal fruits planted in this section are peaches, apples, and pears; of late a good many French prunes. Within the last few years the *A. perniciosus* has been imported by nursery trees and has done a good deal of damage already near Uniontown, no good remedy having been applied yet, to the date of my visit. Upon my advice, caustics, in accordance with Bulletin No. 4, were sent for. In conversation with Mr. F. Valentine, of Lotus, I learned considerable as to the most serious trouble affecting the fruit. It appears that within the last few years certain varieties of peach trees have become much subject to a blight, which causes the flower bud to drop, precisely similar to what I have observed in some other sections nearer the coast. The pears have also, of late, suffered from what evidently is the *Fusicladium*, or scab blight, as described in Bulletin No. 5. These blights can nearly always be traced to some definite form of fungus and deserve the closest study, as they are evidently going to be equally as serious a trouble as our insect enemies, especially in the coast regions and mountain sections. Irrigation is practiced about Coloma, except on the bottom land. Of the olive I saw a few specimens growing which all looked exceptionally healthy; some had grown entirely without irrigation.

Cherry.

The cherry, like most all fruits, comes very early into bearing, and does very well. Most of the fruit has generally found a good market east of the Rocky Mountains, in the green state.

SUTTER COUNTY.

This fertile little county contains a number of fine orchards which, owing to the very early ripening of the fruit in this section, have been and are very valuable. Some of the first planted, like the famous Briggs orchard, have been covered up with slickens, and orchard planters have receded from the Feather River, but still maintain their name for earliness and fertility. In fact, I doubt if any of these orchards can be exceeded in rapidity of development. Cherries, peaches, apricots, and pears are largely planted. The peach moth has proved troublesome in some places, and is on the increase. *A. perniciosus* has not failed to put in appearance, and has infested some of the orchards badly. Nearly everybody is determined to get rid of the scale, but no organization to look after the evil existed previous to my visit. Since then three public-spirited gentlemen have offered to serve as Commissioners, without pay, and have been appointed as a County Board of Horticulture by the Supervisors. It is to be hoped that this example will be followed in a good many counties where actually no organization exists, and where the reason of this has been that the Boards of Supervisors did not think themselves justified in appropriating any money for a commission, the expense of which would have to be borne by many industries not directly interested in fruit growing. Fruit growing has, during the last four years, increased very much on the plains farther back from the river, where the soil, although of not the depth and fertility of the lands near Feather River, still is of sufficient depth for very successful fruit growing. It is principally peaches, prunes, and apricots that have been planted. We find a number of fruit growers which (led by the late Dr. Chandler, one of the pioneer fruit growers of Sutter County), have adopted a style of training which allows the tree absolutely no trunk—by pruning off the stem immediately above ground. This system aims at protecting the body of the tree, but causes the branches to grow almost out of the ground, and has its disadvantage. If not by proper pruning the surface of these side branches are converted into fruitspurs clothed with leaves, they will be liable to sun-scald, being bare and unprotected, rendering them liable to injury by the borer, the very thing it was thought to prevent. In Yuba City are found a number of orange trees, mostly seedlings, which are bearing well and are of fair quality. And the neighboring town of Marysville shows a large number of orange trees, as well as some lemons. In more than one place the red orange scale (*Aspidiotus aurantii*) is found, and trees raised in the vicinity ought to be well scrutinized, as it should be well remembered that this pest, unlike the soft black scale of the olive, lives and flourishes in the hot and dry climate of the State.

CONTRA COSTA COUNTY.

In the early part of March I visited this county, which is rapidly extending the culture of fruits. A large number of fine large orchards have been set out. Nearly all the older orchards exist in the neighborhood of Martinez. Of these some are badly infested with the *A. perniciosus*, no very decided action having been taken to get rid of them before this season, when people have awakened to the necessity of doing something. In the local quarantine guardian, Mr. Holliday, this section has an efficient and painstaking officer. Last year the cottony cushion scale was discovered right in the town of Martinez, in a garden. Thorough steps have been taken to eradicate it if possible, and prevent its further spread. It will, however, require concert of action of all property owners to stamp it out. Everybody seems to be willing, but the insidious foe does not generally look very formidable at first, and people seldom can make up their minds that such a small beginning can have such serious consequences.

At the Martinez grange meeting, where I was present during my stay in Contra Costa, I took occasion to warn people of the approaching danger, and found a very healthy sentiment of the necessity of coöperation among the members. One of the insect enemies most complained of by peach and apricot growers of the valley is the *Diabrotica punctata*, which, especially in sandy or gravelly lands, has done and is doing a great damage. Until we know exactly the habits of the larva of the insects, it will be difficult to be able to tell if sure and efficacious remedies can be found. The insect does the harm in the perfect state, as a beetle, and owing to its habit of continual flying about, is difficult to manage. Most all the remedies have been tried against the insects, but few of them appear to me to have been cheap enough to justify their application. Buhach, six pounds to one gallon of alcohol, and diluted with twenty gallons of water, sprayed on the trees very early in the morning, while the insects are still inactive, cause them to drop, and if sheets are spread on the ground, they can be gathered and thrown into a tub of water, the top of which is covered with kerosene. Smudges have been used to drive them off with, but generally they have reappeared from the neighborhood. This might be successful if done over a large section. The *Diabrotica* is a native insect and is apparently subject to certain enemies, and unfavorable conditions, as in some years it is very little. Among other experiments tried here in this valley, was Paris green mixed with water, and sprayed on a number of peach trees; the effect in this case was most serious, injuring the foliage and even the branches, burning them quite badly. The same strength used on some apple trees did not do any harm; as a remedy for the *Diabrotica*, did not prove anything valuable either, as they returned to the trees.

SHASTA COUNTY.

Having been informed that a good deal of infected nursery stock was being shipped to Shasta County, I decided, in February, to make a trip to this place. I arrived there during a rainy spell and my chances for much observation did not prove very good. I found that a number of orange trees, imported from Los Angeles, full of the *A. aurantii*, had been sold and were still in the nursery, and that the erroneous idea so often met with, that no scale will live when a high and dry summer temperature prevails, had made people careless about it—a belief I have continually tried to disabuse people's minds of. A trip to a number of neighboring young orchards failed to bring out any badly infested orchards, although traces of the San José scale were found in a very few places. I regret very much that my limited time did not allow me to visit the oldest orchard near Millville. The fruits having been chiefly planted have been apples and peaches, and nearly all of them have been planted on rich bottom land. Of late years, however, the rolling hills around Redding have been planted, and when properly cared for have done well without irrigation. A number of prune orchards have also been planted. The soil on these rolling hills is red strong loam, usually in its native state, covered with what is here known as white oak, more correctly the blue oak, or *Quercus Douglassi*. The timber growth all through the county is much stronger than any other foothill regions I have visited; the soil also is generally of greater depth. It is claimed, and doubtless with reason, that this section is much less subject to the so much dreaded north winds, owing to the abundant growth of timber. All about Redding I was surprised to find in the gardens a number of comparatively tender plants and shrubs, including oranges, some trees of which were having fruit on at the time of my visit. It seems, therefore, a fact, that if the locality is well chosen, even at this latitude, the orange can be grown to advantage. The olive, wherever tried, has done exceedingly well. Irrigation is but little practiced for fruit growing, and on the more tenacious soils I think altogether unnecessary. The codlin moth has found its way to parts of the fruit growing sections of Shasta, and, judging from descriptions given me, the peach moth also. The flat-headed apple borer is very prevalent where low training of the trees is not in vogue. Before leaving the county I had the pleasure to meet a small, but interested, audience of fruit growers of Redding and vicinity, discussing the topics of insects injurious to the region, and the adaptation of the various fruits to the region. At the meeting, also, was laid the foundation to the Shasta County Horticultural Society, a movement in which I was partly instrumental.

Beside the counties mentioned, I have made several visits to Santa Clara, Santa Cruz, Sacramento, Marin, and Sonoma Counties, meeting local societies or quarantine guardians.

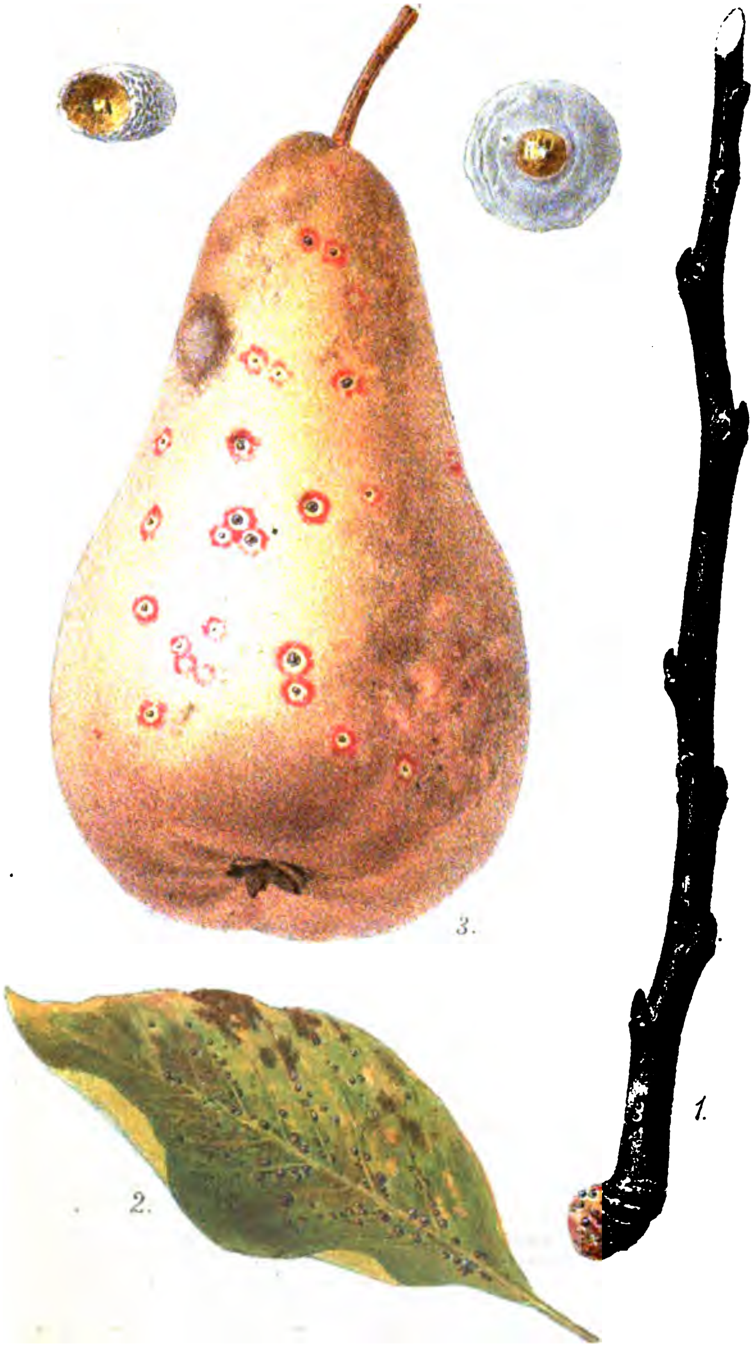
In Santa Clara County active steps have been taken of fighting the cottony cushion scale, the Board of Supervisors finally agreeing to pay a person to act as quarantine guardian. A large number of acacia and locust trees have been cut down, as being the breeding ground of this pest. Other scale insects are being actively persecuted; and, on the whole, a hearty public sentiment is showing itself, albeit some stubborn, careless persons are not wanting.

In San Mateo County I am also gratified to learn, at last, a County Board of Horticulture has been established; and I am informed some of the most prominent citizens of the county have consented to act on the Board.

On a short visit to the Sacramento River district I was gratified at the activity everywhere, and in many cases of the good results persons had with what formerly were considered rather mild remedies for the *A. perniciosus*. Among others, not tried before in the section, the soap remedies of Mr. B. M. Lelong seem to do good work. On a visit to the American River section, where I spent a day or two, I found that excellent work had been accomplished by caustics on the place of R. Stevens, Esq. While in the vicinity, and staying with D. Lubin, Esq., I had the pleasure to see at work an implement invented by him, which comprises the cultivator and harrow; and, judging from the trial made, it will prove very useful for a great many purposes. It stirs and pulverizes the soil to a depth of eight inches, leaving the clods on top.

Several visits have been made to San Rafael, Marin County, where the cottony cushion scale has become badly seated. Some work has been done here; but the pest has spread to the Eucalyptus groves, and extermination is a very hard matter. In company with Mr. J. Wheeler, the

PLATE I.



LITH BRITTON & REY S F ASPIDIOTUS PERNICIOSUS (COMSTOCK)

present chief viticultural officer, some trials with bisulphide of carbon, as an insecticide, were made.

During the last month I also attended the meeting of the Sonoma County Horticultural Society. A full discussion of the remedies against the codlin moth was had, and considerable interest was taken by the members. The question of appointing a Board of County Commissioners was brought up, and a committee was appointed to urge upon the Supervisors to have a Board appointed, the last attempt to get one established having failed. Various members expressed as their conviction that if the matter was well explained to the Board of Supervisors the Board would be appointed.

Report on Various Injurious Insects, and Remedies Against Their Ravages.

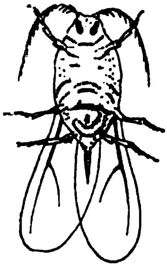
SCALE INSECTS.

Aspidiotus perniciosus.—There is no other scale in California found infesting deciduous trees that has done so much harm, or which has spread over such an extent of territory, having been found in nearly all the counties from Shasta to San Diego.

The following description is taken from the report of the Board, 1881; the cuts are from the same.

The colored lithographic Plate I shows the insect as it affects leaf, branch, and fruit. Also male and female scale enlarged; the female is circular in outline, the male the oblong. Fig. 1. Male insect (perfect), winged. Description: Scale, about one sixteenth of an inch in diameter (scale of male insect elongated); color, center yellow, margin dark mottled gray; eggs, thirty to fifty produced by each female; color, yellow; form, ovate; larva, six legs; two antennæ, six-jointed; two anal setæ; body, color yellow; form, oval. Male insect (perfect), winged—wings nearly transparent; body, color light amber, with dark brownish markings; antennæ ten-jointed (hairy), and stylet nearly as long as body.

FIG. 1.



Habits of the Insects.

It is generally accepted as a correct statement that this insect has three distinct broods—one in June, one in August, and one in October—at which times all the scale eggs are supposed to hatch. As might be expected, the time for these hatchings varies somewhat according to climate and locality, a warm location hastening the development. But what is of more importance is that all the insects evidently do not hatch out at once. During most of the time of the growing season there can be found young lice crawling around, though certainly at the periods stated they are most numerous. Yet enough will linger along between every two of these periods to prevent summer washings to be thorough remedies, as the old scales are too well protected to be killed by anything that can be applied in the summer. I believe this is the reason why persons have been unsuccessful in their treatment against these insects, and hence I am of the opinion that winter treatment, when we can apply remedies strong enough to kill the protected insects, is the best time to accomplish the desired result. One most important point to be considered in spraying is the size of the tree. While it is a comparatively easy thing to reach every part of a small tree, a large tree, particularly one with rough bark, it is almost impossible to cover with the spray. Whenever extermination is sought, and large trees are to be treated, we must be prepared for some sacrifice.

Modes of Treatment.

Trees above twenty feet need cutting back to convenient height, and also a thorough thinning. If a tree be old and has rough bark, it would be better to have the top completely renewed, by cutting the head off and scrubbing the remaining body. Trees treated in such a manner can be thoroughly cleansed, a fact of which there is abundant proof in every county in the State.

Solutions.—One of the most successful solutions we consider one half pound of concentrated lye and one half pound commercial potash to five quarts of water; this to be used only when the trees are dormant. This remedy we have tried with thorough satisfaction, and have seen favorable results in many orchards in the State. Objections to this remedy have been raised by a great many persons. One of the most serious ones is its comparatively high cost. This certainly is a valid one, but I have still to see the orchard where this remedy, rightly applied, has not worked extermination whenever this was feasible. Another objection is damage to fruit buds, especially to pears, and to young bark. Whenever trees are not perfectly dormant, this may happen, and, as in certain seasons trees in some sections do not seem to be entirely dormant, this may be also a serious objection in certain cases, and other milder remedies may be preferable.

Washes Containing Free Oil.

We have from the beginning been adverse to the use of insecticides containing free oil, believing that they would prove injurious to the tree in the long run. Actual trial and observation have, however, convinced us that there is much less danger than supposed, and, in case the remedy is well applied, no danger seems to exist. In Santa Clara Valley a very simple solution is used, and has its strong advocates, and justly, so it appears. If not well applied, however, the oil may become too concentrated and cause serious damages. The formula generally used is one gallon of whale oil poured into twenty-five pounds of sal-soda, which has been dissolved in twenty-five gallons of boiling water. Use warm at 130 degrees; stir well; apply to dormant trees during winter.

A number of preparations, the exact nature of which are a secret, are being used. Among them a preparation prepared by Mr. Woodbury has proved a good insecticide, and is indorsed by a large number of growers. This remedy also contains free oil (fish or other oil).

Kerosene.—A large number of washes contain kerosene. In fact, many persons have used it pure and simple. On certain varieties of trees, especially pears, it seems that its use has not been harmful for one or two applications, but its greatest danger lies in the oil penetrating to the root. We cannot recommend kerosene except as emulsions, and then the greatest care must be taken to prevent its separation from the water.

The following is Prof. C. V. Riley's formula for preparing kerosene emulsion to be used as a summer wash:

Kerosene, 2 gallons = 67 per cent.
Common or whale-oil soap, one half pound } = 33 per cent.
Water, 1 gallon,

Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream, which thickens on cooling and should adhere without oiliness to the surface of glass. Dilute before using, one part of the emulsion with nine parts of hot water. The above formula gives three gallons of emulsion, and makes, when diluted, thirty gallons of wash.

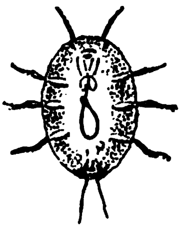
Note.—It is of the greatest importance that the above mode of preparation is followed strictly, otherwise the result may produce an unstable emulsion, which has all the objectionable features of a mixture of water and kerosene.

The emulsion can be easily and quickly made by using a good force pump, so constructed that it can be inserted directly into the liquid, which must be kept in constant and violent agitation by forcing it through some form of spray nozzle back into the same receptacle.

The Geiger Wash.—This is highly recommended by many fruit growers of San José: Six pounds concentrated lye, six gallons water; to this add four pounds sulphur, and set to boil. Then add nine gallons of water. While boiling, add three gallons whale-oil foots. Finally, add fifteen gallons of water in which three pounds of saltpetre have been dissolved. Apply hot—about 130° F. This wash has been used on cherries, particularly, with success.

Aspidiotus rapax, or white pear or apple scale.—Description of scale and insect: Scale, about one sixteenth of an inch in length; form, ovoid; color, drab; larva (see Fig. 2), less than one hundredth of an inch in length; two antennæ, six-jointed; two anal setæ. Female, bright yellow. Male, winged. This insect is found in many places along the coast. It infests, chiefly, pear trees, hence its name. It is distinguishable easily from the *Aspidiotus perniciosus* by its whitish yellow color, contrasting with the dark color of the latter. And another point of difference: the white pear scale leaves no special mark where it has been, while the *Aspidiotus perniciosus* invariably is followed by red markings, hence the name occasionally given to the latter, "red scale."

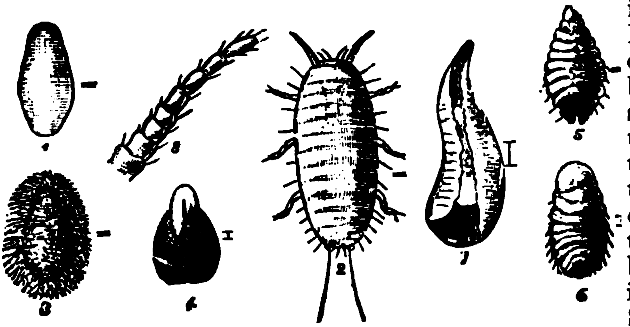
Fig. 2.



Generally, this white scale has only one brood in the season, but I have found them breeding on pears in the storehouse during the winter. As compared with the pernicious scale, it is of little danger, owing to its rather slow breeding propensities.

Aspidiotus conchiformis, Gmelin; *Mytalaspis pomicorticis*, Riley (apple-bark louse, or oyster-shell scale), is one of the few insects which the Northeastern States have in common with us. Like the preceding one, it has only one brood during the season. It affects the apple chiefly, although sometimes the pear, also. It is confined chiefly to the coast counties, but is also found in other places, as San Joaquin County.

Fig. 3.



Owing to the thickness of the armor, it is one of the most difficult of the scales to exterminate.

Description of Fig. 3: 1. Egg; 2. Young insect (larva); 3. Appearance of secretion as it hardens and forms shell over body of insect; 4. A form of the scale before it reaches maturity; 5 and 6. Appearance of insect after casting skin, limbs, and other appendages; 7. Scales (cover) at maturity; 8. Antennæ. All of these figures highly magnified. Description of insect, etc.: Eggs, number under each scale, thirty to seventy-five; length, one one hundredth of an inch; form, irregularly ovoid; color, snow white, when near hatching, yellowish. Larva: Length of body, one one hundredth of an inch; form, ovoid, three times as long as wide; color, pale yellow. Antennæ, sometimes six-jointed, but generally seven-jointed. Anal setæ, two, about two thirds as long as body. Male insect (perfect): Length, one forty-fifth of an inch; color, flesh colored gray; abdomen and thorax, about same length as seen from above; wings, nearly transparent. "The last joint of abdomen narrowed into a large tubercle bearing four bristles on the under side, and sending forth the genital armor in the form of an awl-shaped stylet as long as abdomen."

Remedies.—For a number of years we have tried to find an effective remedy against this scale. We have tried concentrated lye, one pound to the gallon, with the effect of damaging the trees. Finally, one half pound of lye and one half pound commercial potash to one gallon water was used last winter, and applied to the orchards on the experimental grounds of the University. The success was very marked. No damage was done to any but a few trees that had started prematurely. With various summer washes on this scale, we accomplished but little good. Among those used was the "codlin moth wash," and also the sour milk kerosene emulsion recommended by Professor Riley. This emulsion was used thoroughly at different times, but failed. I attribute this failure to the climate, the dry atmosphere causing the kerosene to evaporate too rapidly. It is evident that unless used with soap, it will have but little effect.

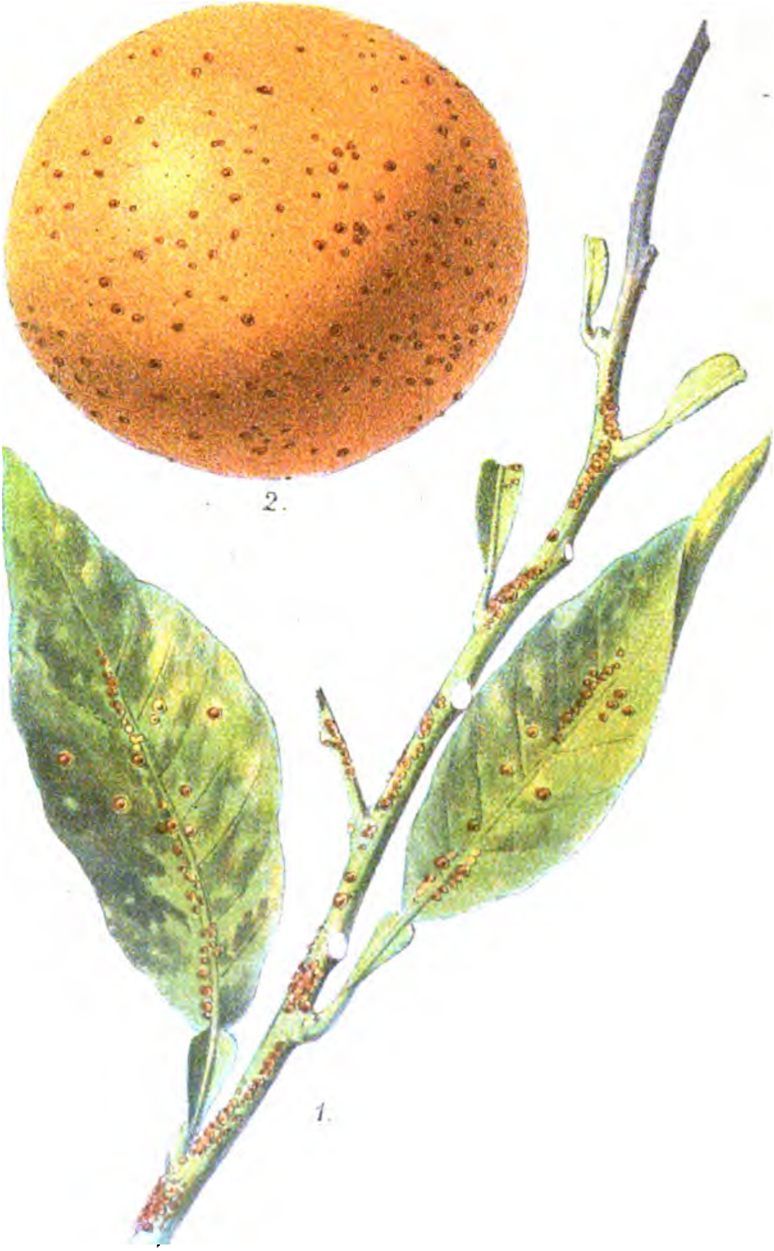
SCALE INSECTS AFFECTING CITRUS TREES.

Aspidiotus aurantii, familiarly known as the red orange scale. Plate III shows the appearance and work of this insect, which, practically, is confined to the citrus trees, to which it is a formidable enemy. The branch (Fig. 1), shows the numerous scale present on the branch, and which caused it to dry up and wither, an effect different from that produced by another variety of red scale of which we shall presently speak. When mature the covered scale presents a bright red appearance. Fig. 2 shows an orange covered with the mature scale.

The following is taken from the report of Mr. M. Cooke to the Board (see report of 1881). Scale, matured, one twelfth of an inch in diameter (in a few cases it exceeds this); color, center yellow, margin light brown; eggs, from twenty to forty under each scale; form, ovoid; color, bright yellow. Larva: length, one one hundredth of an inch; form, ovoid; color, bright yellow; antennæ, six-jointed. Female insect: color, yellow. Male insect (perfect), winged, about one forty-fifth of an inch in length; wings clear, nearly transparent; color of body, amber yellow, with slight dark markings; anal stylet appendage nearly as long as body.

Remedies.—Various soap remedies have proved quite efficient. We recommend the summer wash mentioned above. Various compounds of a soapy nature, and their constituents, known only to their makers, are being used. Among others used is that of Mr. B. M. Lelong, of San Gabriel. His wash,

PLATE III.

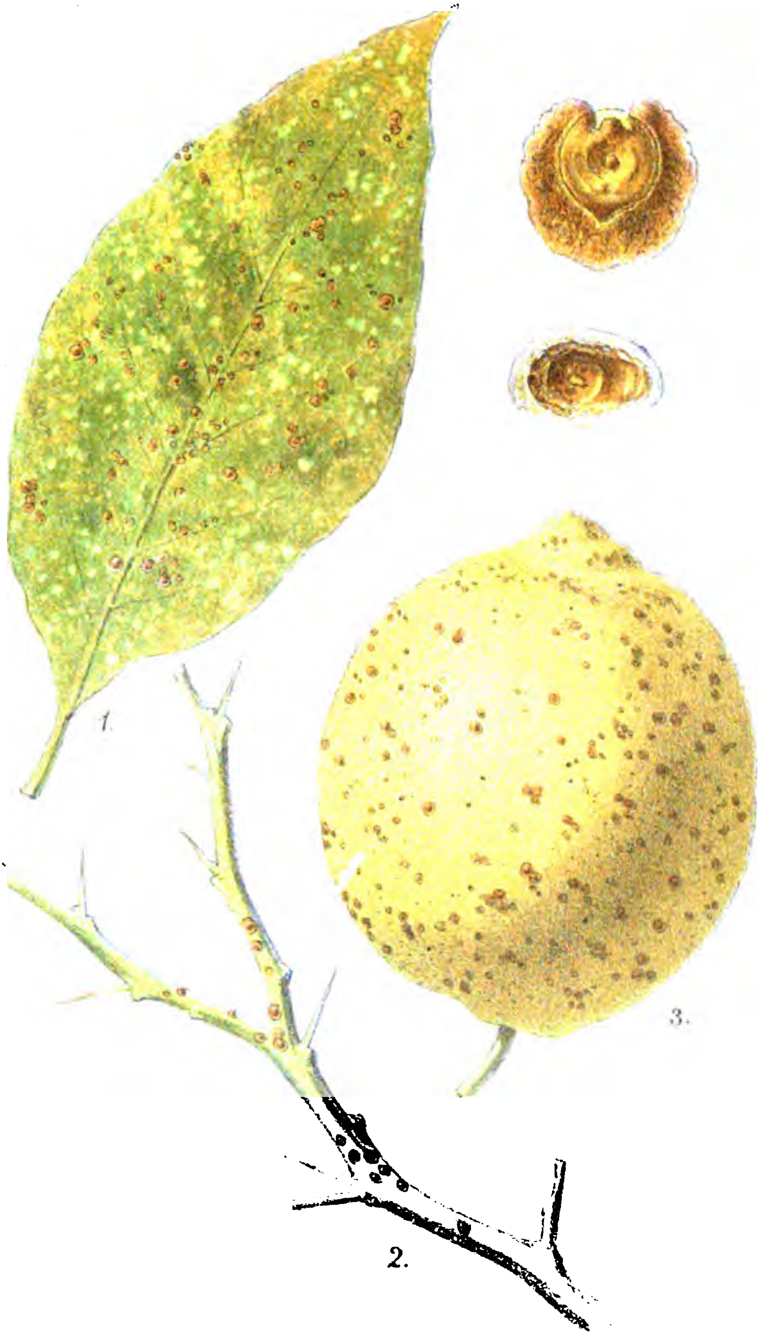


LITH BRITTON & REY S F

ASPIDIOTUS **AURANTII.**

TRUE TYPE.

PLATE II.



H BRITTON & REY S F

ASPIDIOTUS AURANTI (MASKELL)

regarded with satisfaction, is used considerably in Los Angeles County. It is prepared by this formula:

RECIPE FOR MAKING FISH-OIL SOAP FOR SUMMER WASH.

(Ingredients for one barrel of fifty gallons.)

Potash	14 pounds.
Caustic soda, 98 per cent	8 pounds.
Lime, unslacked	5 pounds.
Fish oil, Polar or Seal	10 gallons.

First dissolve the soda and potash by placing them together in twelve gallons of water. Second, slack the lime in the barrel to be used, in two gallons of water, then add the fish oil to the lime and stir well until the lime and the oil have turned to a thick butter, then add the soda and potash, water boiling hot, and stir well with a dasher for five minutes or more, then leave standing four or six hours; at the end of four or six hours fill up with cold water; do not pour in all the water at once, but about two buckets at a time. Stir well as the first two buckets go in, to prevent lumps; use the following day. Apply cold, one pound to the gallon of water. In dissolving it do not boil; but weigh the amount to be used, place in a barrel, and on top of it pour hot water, about one bucket to every hundred pounds. After pouring in the hot water stir lively with a dasher until it is entirely dissolved, then reduce with cold water sufficiently thin enough to pass through the strainer; then place in the tank and fill up with water, stir well, and it is ready for use.

The great trouble in regard to this insect, in common with others, is to always reach it. A large orange tree presents a dense mat of foliage, and it has been proved by more than one experiment that it is an impossibility to reach every point in a large tree, and consequently it would seem that extermination by spraying can never be accomplished. However, it can be so kept in check that it will do but little harm. The only way that extermination can be accomplished is by cutting off the heads of the trees and scrubbing the trunks with strong soap solution to which some caustic has been added, and then allow the tree to start out again. This treatment should be administered in spring, after the crop has been taken from the tree. In two years a tree can be completely renewed and in bearing again. In some parts of Los Angeles County, also in Sacramento City and about Marysville, a distinct variety of red orange scale is found. According to the best authority it cannot be considered specifically distinct from the *Aspidiotus aurantii*, yet its appearance and manner of attack are so different that we have thought it worthy of a special plate. The difference of opinion in Los Angeles County as regards the efficacy of certain remedies, and also as regards the more or less dangerous character of the red scale, is doubtless due to the fact of the two varieties being confounded. Of the two, the first named or true type must be regarded as the most dangerous. The appearance of trees infested with this pest is very striking, very much resembling those diseased from other causes, such as bad drainage, the leaf presenting a mottled appearance, a light blotch around the scale, contrasting with the natural green of the leaf. The branches are but little troubled, but the fruit, like the leaf, becomes completely covered with the insects. An orange tree infested with this scale gradually becomes sickly and languishes, though I have never seen any that were actually killed by this scale.

Description.—Plate II shows the appearance and work of this insect: 1. Scales on leaf; 2. Scales on branch; 3. Scales on fruit (lemon all in natural size); 4. Female scale, the larger; 5. Male scale, the smaller, both enlarged.

Remedies.—The same remedies used for the common red scale have proved valuable, and perhaps more efficacious. The greatest trouble appears to be to reach every part of the tree. The remedy of whale-oil soap and sulphide of soda, recommended by us on page 210 for deciduous trees, has proved valuable.

*Lecanium oleæ** (olive scale).—A great deal has been written about this scale insect, one of the most common along the coast. It is a troublesome nuisance on citrus trees, creating the honey dew, on which the fungus *Fumago salicina* (commonly called smut) feeds. But by spraying with a whale-oil solution once a year it can be kept in check. It infests various fruit trees, being found very often on apricot and peach. On the latter it is easily exterminated by thorough spraying in winter with weak lye washes, as one fourth pound concentrated lye, one fourth pound potash, to one gallon water. The question of killing this scale on the olive is a more difficult matter. Probably because the insect is more adapted to this tree than to any other. Mr. Ellwood Cooper, of Santa Barbara, has probably given more attention to the extermination of the insect than has any one else in the State. While he has several successful remedies against the young scale, as hot tobacco water, whale-oil soap washes, etc., yet so far he has not been successful in finding any satisfactory compound cheap enough that will kill adult scales without injuring the tree also. A difficulty in exterminating the scale on olive trees seems to be much the same as in the case of pests on the orange, namely, the density of foliage on large trees, making it almost impossible to reach every part with the washes. Spraying young trees with whale-oil soap and with sulphide of soda has worked well on a small scale, and this year has been tried extensively at the Quito Ranch, in Santa Clara County, whence we shall probably soon have reports.

Mr. Ellwood Cooper recommends the following: Five gallons best kerosene oil, 150° test; one and a fourth pounds good common soap, or one bar and a half of soap usually sold as pound packages; two and a half gallons of water. This makes the emulsion. When using, dilute six and a half to seven gallons of water for each gallon of oil, and to this mixture add two and a half pounds of good home-made soap dissolved in boiling water. All this mixing is done with hot water. We usually have the solution up to 140° in the tank from which we spray.

For badly infested trees the radical cure of cutting off the top and scrubbing down the trunk with weak lye washes was tried by Mr. Frank Kimball, of National City, and proved a decided success, for the trees soon formed a new top as large as before, and were loaded with fruit.

To escape the black scale completely, by finding a place where it does not thrive at all, we must leave the coast entirely. It is a well known fact that its presence is not observed in the interior valleys.

The fact that dry heat is very unfavorable to the development of the scale was abundantly illustrated last season. This was noticeable in the southern coast counties, where a hot wave swept over the country desiccating everything. Various persons, from Santa Cruz to San Diego, called my attention to the fact that vast numbers of the black scale had been killed.

There is another serious check to the black scale in the form of a chalcid fly (*Tomocera Californica*), which is very abundant wherever the black scale is found. The eggs are laid by the fly, inside the scale, through a hole pierced during oviposition. The larva feeds upon the young, or eggs of the scale, and issues a mature insect through a circular hole. In many instances nearly half of the scale will be found thus pierced.

So far as has been observed, there is only one brood of the scale in a season, but like all other scale insects, all the young do not hatch at once, some lingering along for quite a time. It is this habit that seriously interferes with successful extermination of them, since, after all the young have been killed by adequate spraying, yet enough old ones remain with eggs for infesting the trees again. In Santa Clara Valley the general hatching occurred this year in the middle of August, and in Santa Barbara somewhat later. The time, of course, varies with climate and locality.

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*For descriptions of this scale insect and others not described, see report of 1881 of the State Board of Horticulture.

Lecanium hesperidium is generally known as the *soft orange scale*. This insect has a wide range, being found abroad as well as in many localities in this State, and, unlike the black scale, it will thrive in a hot, dry climate. For instance, it is found in gardens in San Bernardino, infesting orange trees badly. It also gives nourishment to the black smut, making the trees present the same appearance as those affected with black scale. This soft scale has only one brood, and is easily destroyed by a strong soap wash, consequently there is no excuse for letting it disfigure the trees. This scale, also, is often found pierced by a hole similar to that found in the black scale, and is caused by one of this species of parasites known to keep the scale in check.

Lecanium hemisphericum is a dark brown species infesting various native trees, among them the California redberry bush (*Heteromeles arbutifolia*); from this it spreads to evergreen as well as to deciduous trees, especially apricots. This species is readily killed by alkaline washes, half the strength recommended for *Aspidiotus perniciosus*. Beside this, two more species of *Lecanium*, at least, yet unnamed, infest native trees on the coast, especially the California buckeye (*Æsculus Californica*). Both the apricot and peach suffer from their attack; but, fortunately, they are as easily checked as the black scale.

Pulvinaria innumerabilis is a scale infesting grapevines, and from the cottony excretions which so abundantly surround its eggs, has been called the *cottony grape scale*. It has more than once been confounded with the dreaded *Icerya purchasi*, from which it is most easily distinguished, the body of the latter being soft and fleshy, while the grape scale is horny, like most all *Lecaniums* in mature state. This insect does not seem to increase, and has never been very troublesome. A gentleman of San Diego has lately made the observation that it is attacked by a native species of ant. Probably this is the check that prevents their increase.

Icerya Purchasi.

Fluted scale (Professor Riley), white scale (in Los Angeles), cottony cushion scale, Australian bug (in Capetown, Africa)—under these various names is this, one of the veritable pests to orange growing, known in different sections. It would be advisable to reduce all the names to one, and we favor the name of fluted scale, proposed by Professor Riley. The true home of this insect is still a subject of inquiry, as the following appended letters will show; but we hope before very long to settle the question of the identity of this insect with the *I. sacchari*, as mentioned below. Suffice it to say, that this insect has existed in San Mateo County since 1868, whence it is supposed to have come from Australia. It now, unfortunately, can be found in many sections of the State, and is steadily spreading. In the south it has reached as far as San Diego, although, thanks to the efficient efforts of the San Diego County Board, it must be considered well-nigh exterminated here; north, it is found as far as Sacramento City. In the following counties it exists to cause, or ought to cause, serious apprehension:

Los Angeles, Santa Barbara, San Mateo, Santa Clara, Sonoma, Napa, Marin, Contra Costa, and Sacramento.

Description.

Plate IV will give the reader a good general idea of the fluted scale. Fig. 1 represents a branch of Japanese orange, natural size, covered with the insect in its various stages. Fig. 2 represents a full grown female, much enlarged, with the egg sack laid open, showing eggs and young insects just hatched. Fig. 3 represents a full grown female larva, enlarged.

The following detailed scientific description is borrowed from Prof. C. V. Riley's report, as it appeared in "Pacific Rural Press," and the excellent cuts are likewise from the same.

The cuts are kindly furnished us by "Pacific Rural Press."

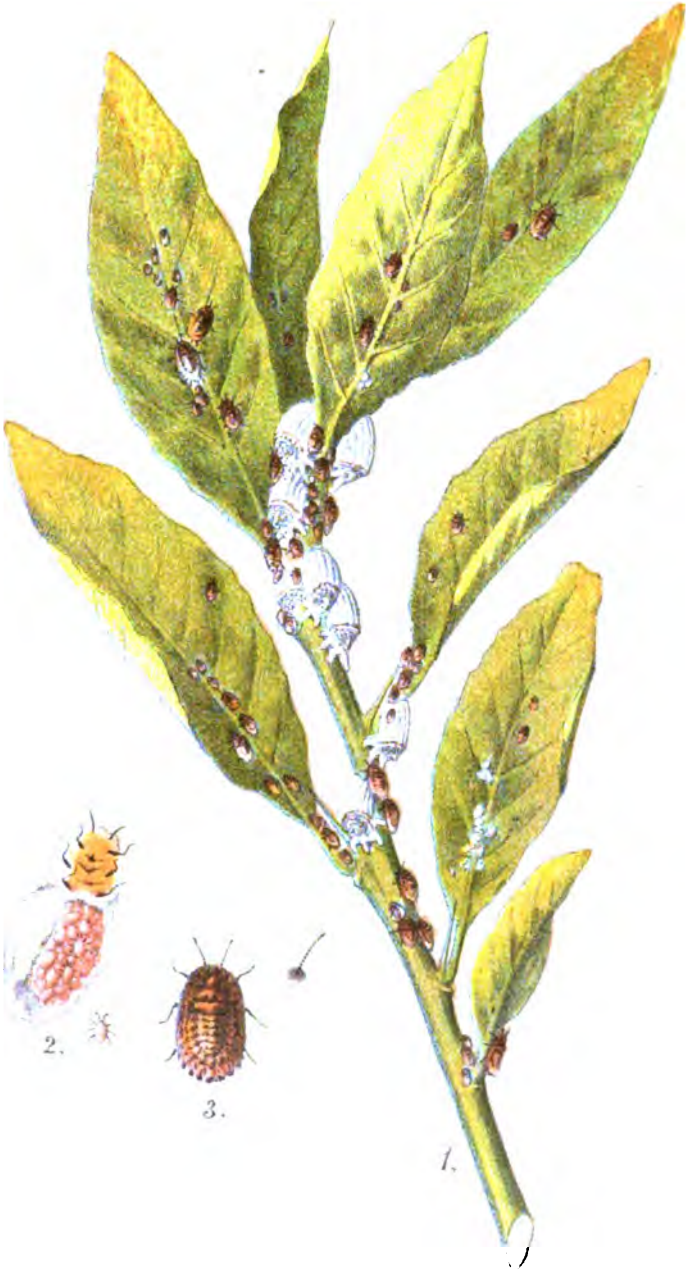
The Egg (Fig. 1).—The egg is quite smooth, elongate-ovate in form, and is of a deep orange yellow color. It measures about 0.7 mm. in length.

The average number of eggs laid by the female varies according to the vigor of the individual or the condition of the plant upon which she dwells, prolificacy diminishing in proportion as the plant is badly infested—a general law among Coccidæ. Over eight hundred eggs have been counted in a single egg mass by Mr. Coquillett, while Mr. Koebele has counted in a single egg mass, which, by the way, was found upon nettle (*Urtica holosericea*), nine hundred and forty eggs and seventy-two young larvæ, while one hundred and twenty-three eggs yet remained in the dead body of the female, making a total of one thousand one hundred and thirty-five eggs from the single female.

The time required for the eggs to hatch after leaving the body of the female varies with the temperature. In the winter time the sacs are usually filled with eggs, while in the hottest part of the summer seldom more than one or two dozen will be found in each sac. Some collected by Mr. Coquillett on the eighteenth of March did not hatch until the tenth of May, but in midsummer hatching is only a matter of a few days.

The Female Larva—First Stage (Fig. 2).—The newly hatched female larva (and probably the male is identical with it at this stage of growth, since we have not been able to separate them into males and females), is red in color, inclining somewhat to brown. The body is ovoid in outline, being flattened beneath and convex above. The antennæ are long and six-jointed. Joint one is short and stout, and as broad as long; joints two, three, four, and five, subcylindrical and subequal, much more slender than joint one, and twice as long as broad; joint six is as long as four and five together, and forms a long club, at base equaling joint five in diameter, but broadening out to twice its width at tip. The basal portion of the club is sometimes distinctly separate from the rest, forming an additional joint. All joints have a few sparse hairs, and the club, in addition to several short ones, bears near its tip four very long ones, each of which is considerably longer than the whole antenna. The legs are thin and brown in color. The coxæ and femora are moderately large, while the tibiæ and tarsi are long and thin, the terminal joints of the latter bearing several long hairs. The upper digitules are represented by simple hairs, but the lower ones are present and are bent near the base. The eyes are prominent and are each mounted on a short tubercle. The mentum is broad and apparently two-jointed. The rostrum is broad at base and the rostral setæ are not very long. At the tip of the rounded abdomen are six small tubercles, three each side of tip, each of which carries a long, stout hair, which is as long as the whole body. The body above shows six rows of

PLATE IV.



LITH BRITTON & REY S F

ICERYA PURCHASII (MASKELL)

secretory pores, four along the middle and one on each side. More or less regular rows of hairs alternate with these pores.

Female Larva—Second Stage.—According to Maskell and Comstock, there are but three stages of growth in the female after hatching, and these are readily distinguished by the number of antennal joints; the larva of the first stage having six, that of the second nine, and the adult eleven. Messrs. Coquillett and Koebele came to the same conclusions, and all have overlooked a form which we have found quite abundantly among the material we have studied, and which seems to constitute an intermediate stage between the so called first and second, and which is, of course, produced by an additional molt which we have personally observed in the field. Hence the so called "second stage" of these authors becomes third, while the adult female is fourth instead of third, and there are three molts instead of two.

This new intermediate form (Fig. 3) differs from the female larva of the first stage in the following respects: It is much more rounded and of a stouter general appearance. The antennæ have the same number of joints, six, but their relative proportions are quite different. The antennæ, as a whole, are relatively much shorter. Joint one is short and stout, its length equaling its breadth; joint two equals joint one in length, but is not quite so broad; joint three is as broad as joint two, but is twice as long; joints four and five are equal in length and width, each narrowing somewhat at base and tip, each considerably narrower than joint three, and each of the same length as joint two; joint six (club) is of an irregular shape—at base it is as narrow as joint five, but it broadens until it is slightly wider than two or three, and its tip is narrowed again; its shape is that of an irregular rhomboid with rounded angles and sides, the acutest angles at base and tip. The antennæ carry about the same number of hairs as in the first stage, but those homologous with the four very long hairs of the club in that stage are in this second stage but little longer than the other antennal hairs. The eyes do not appear on the margin of the body, and are only seen on a ventral view. The legs are proportionately much shorter, and the femora are stouter; the trochanters are broader distally, and consequently form a broader triangle in shape. The six tubercles at the anal end of the body are still present; but the hairs which they bear are much shorter. The secretory pores are no longer arranged in rows, but are scattered sparsely over the back and under the sides. The back is more hairy, and the short black hairs occur in irregular tufts.

Female Larva—Third Stage (Fig. 4).—That which has heretofore been considered the second stage, and which, as we have just seen, is the third, may be described as follows:

The body is broadly oval in shape and reddish brown in color, but is soon obscured more or less by the thick, curly, cotton-like excretion. The antennæ are nine jointed instead of six, and are subcylindrical, tapering somewhat from base to tip. Joints four, five, six, seven, and eight are subequal in length, and each is about as long as broad; joints two and three are broader and considerably longer; joint one is like the corresponding joint in the previous stage; joint nine (club) is a suboval joint, proportionately much smaller than in the previous stages; it does not exceed joint eight in width, and it does not quite equal joints seven and eight together in length. The long hairs of the club are proportionately quite short. The insect as a whole is much more hairy than in either of the previous stages. The hairs are short and black, and show a marked tendency to grow together in tufts; even when their bases are well separated, their tips turn toward each other or toward the common center of a group; they are quite thickly scattered over the thorax, but less so over the abdomen; all around the edge of the body they appear in close tufts, and the concentric subdorsal ring of tufts which is so prominent in the next stage is plainly seen in this. The secretory pores are scattered irregularly all over the back, and are more numerous than in the previous stage; they also occur under the lateral edges of the body. They are small and circular, and seen directly from above have a double outline, indicating a circular central orifice. Around the edge of the body is a row of much larger pores, brown in color, which protrude from the body, masked by the lateral tufts of hairs, each with a circular crown or lip at tip, from which proceeds a long, fragile, glassy tube. (Fig. 5.) The legs and feet are a little stouter than before, the tarsal

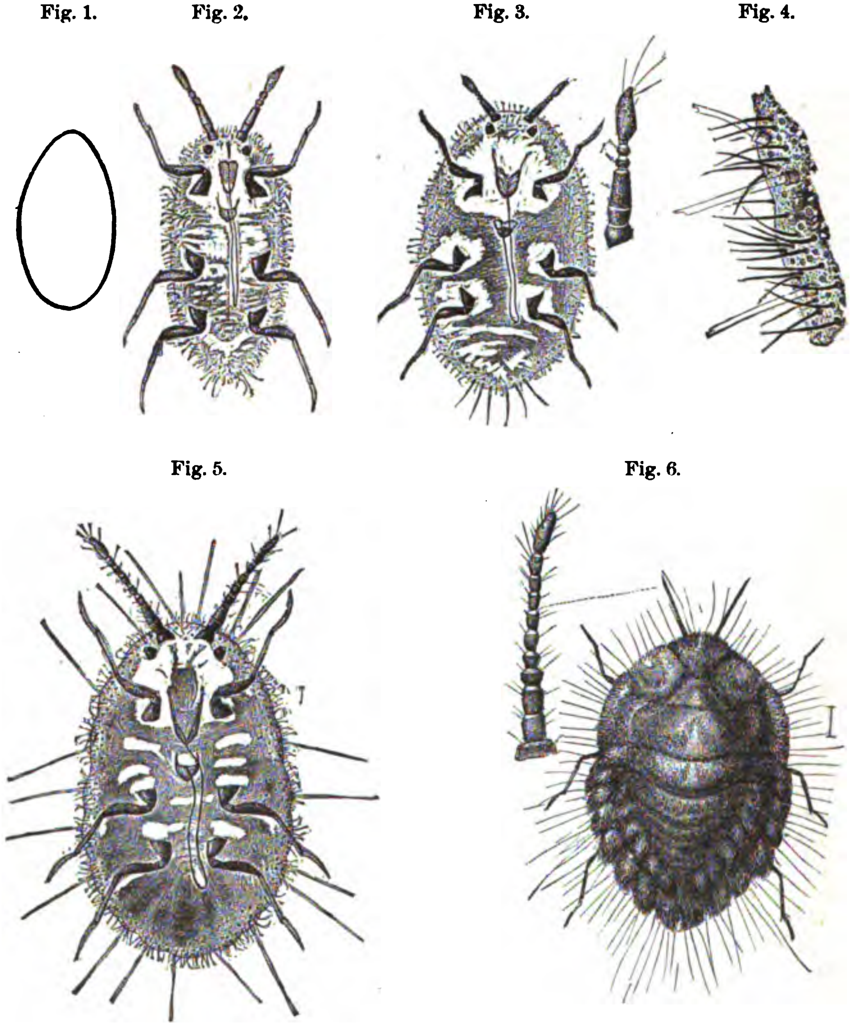


Fig. 1. Fig. 2. Fig. 3. Fig. 4.

Fig. 5. Fig. 6.

Female Icerya, from Egg to Adult Form.

digitules are shorter, and their enlarged tips quite indistinct. The six anal hairs are still present, though hardly noticeable as they protrude from the mass of shorter hairs.

The Adult Female—Fourth Stage (Fig. 6).—Immediately after the molt by which the insect passes into this stage, it is free from the waxy excretion, and presents a broad, oval form, flattened below and quite strongly convex above, with two prominent raised surfaces on the second and third thoracic segments. Its color is still reddish brown, with several darker spots, especially upon the front half and along the sides of the posterior half of the body, and the antennæ and legs are black. The antennæ are now eleven-jointed instead of nine; joint one is nearly twice as wide as long; joints two and three are subequal in length and thickness, and are each somewhat longer than broad; joint four is a little more than half as long as three, and is narrower; joints five, six, seven, eight, nine, and ten increase gradually and slightly in length and decrease very slightly in width; joint eleven (club) is irregularly ovoid, and is one and a half times as long as ten; the special hairs are a little shorter than in the previous stage. The whole body is furnished with short, black hairs, more numerous than in the last stage, arranged in tufts, particularly around the edge, where they occur in a double parallel row, the inner row being practically subdorsal and accentuated by a slight ridge. Down the central portion of the dorsum of the abdomen the segments are indicated by the transverse rows of hair tufts. The secretory pores are exceedingly abundant, occurring in enormous numbers just under the lateral edges of the body, and scattered more sparsely over the back. The individual wax filaments which issue from these pores are very delicate and curly, and there is reason to suppose that two or three issue at one time from one pore, as they are frequently seen connected at base; the pore opening, however, seems to have a single simple opening. The inner row of tufts on the back is broken at its anal point by a depression, in which is situated a very large pore, from which the insect occasionally ejects a globule of a semi-liquid honeydew. This depression is surrounded by an irregular ring of hairs, which are yellowish in color instead of black. The glassy filaments arising from the large tubular pores described in the last stage are now very long, and radiate from the body in almost every direction. They break off easily, yet still often reach a length double that of the insect and her egg-sac together. What is probably the opening of the oviduct is situated on the underside of the seventh abdominal segment. It is surrounded by a transversely oval chitinous ring.

The Egg-Sac.—As the body of the female begins to swell from the eggs forming inside, the beginning of the egg-sac is made. The female lies flat on the bark, the edges of the body turned slightly upward, and the waxy material of which the sac is composed begins to issue from countless pores on the under side of the body, but more especially along the sides below. As the secretion advances the body is raised, the cephalic end being still attached, until, near the completion of the sac, the insect is, apparently, standing on its head, nearly at right angles to the surface to which it is attached. The egg-laying commences as soon as a thin layer of the secretion has formed on the under side of the abdomen, and it continues during the formation of the sac. There soon appears around the edge of the abdomen a narrow ring of white felt-like wax, which is divided into a number of flutings. These flutings grow in length, and the mass of eggs and wax under them increases, forcing the female upward until the sac is completed. When completed, it is from two to two and one half times the length of the female's body. It is of a snow white color, and the outside is covered with fifteen of these longitudinal ridges, or flutings, of subequal size, except that the middle one is smaller than the others. The upper part of the sac is firm in texture, but the lower is looser and thinner, and from the middle of the under side the young make their escape soon after hatching. The size of the sac and the length of time required in its growth depends, leaving the weather and the health of the food-plant out of consideration, upon the number of eggs which the female deposits. So long as oviposition continues, the secretion of wax accompanies it, and the egg mass grows. Concerning the rate of growth, Mr. Coquillett gives the following instance:

> On the fourth of May of the present season I marked a large number of females which were located upon the trunk of an orange tree that was not in a very healthy condition. These females had just begun to secrete the cottony matter, the latter at this date being in the form of short but broad tufts around the margin of the abdomen, those at the hind end of the latter being longest. By the thirty-first of May the cottony matter was equal in length to one third of the female's body, and by the middle of July it about equaled in length the entire body of the female. As the egg-masses of some of the females upon the same tree were longer by one half than the bodies of the females which produced them, it is very probable that at least another month must elapse before the egg-masses of the females which I observed would be completed. It is altogether likely, however, that these egg-masses would have been completed in a shorter time had the females been located upon a healthy tree. The egg-masses found upon healthy trees attain larger size than those found upon sickly trees, owing, doubtless, to the fact that the females living upon trees of the former kind are more vigorous than those upon unhealthy trees.

The Male Larva—Probable Second Stage.—Neither Mr. Coquillett nor Mr. Koebele were able to distinguish the male larvæ until these had reached the stage in which they form their cocoons. Among the specimens studied at the Department, and which were sent alive from Los Angeles by Mr. Koebele, we have found a larval form which has not yet been described, and which we strongly suspect may be the male in the second stage. This form is illustrated at Fig. 1. It differs from our supposed second stage of the female in its more slender form, longer and stouter legs, and longer and stouter antennæ. The legs and antennæ are not only relatively longer and stouter, but are absolutely so. The body above is much more thickly clothed with the short stout hairs than the corresponding female stage, and the mentum is longer and darker colored. The antennæ are six-jointed, and the joints have precisely the same strange relative proportions as in the female. The secretory pores are present, but are not quite so numerous as in the female.

Male Larva—Third Stage.—In this, the third or last larval stage, the male is readily distinguished with the naked eye from the female in any stage by the narrower, more elongate, more flattened, and evenly convex form of his body, as well as by his greater activity in crawling about the trunk or branches of a tree. More careful examination shows that the beak is entirely wanting, the tubercle from which it arises in the earlier stages being replaced by a shallow triangular depression. The body is almost naked, being very sparsely covered with a short, white, cottony matter, and is destitute of the short but stout black hairs which are found upon the body of the female during the third and fourth stages of her life. In the absence of black spots and in the nine-jointed antennæ, he agrees with the similar or third stage of the female, and the average length when full grown is about 3 mm. and diameter about 1 mm.

The Male Pupa and Cocoon.—When the male larva has reached full growth and is ready to transform, it wanders about in search of a place of concealment, finally secreting itself under a bit of projecting bark, under some leaves in the crotch of the tree, or even wedging itself down under a mass of females. Very frequently, probably in the majority of cases, it descends to the ground and hides under a clod of earth, or works its way into some crack in the ground. Having concealed itself, it becomes quiescent, and the delicate, flossy substance of which the cocoon is formed begins to exude abundantly from the body. This material is waxy in its character, but is lighter and more flossy, and less adhesive than that of which the egg-sac of the female is composed. After a certain amount has been exuded, the larva moves backward very slowly, the exudation continuing until the mass is from 7 mm. to 10 mm. in length. From this method of retrogression it happens that the body of the larva is frequently seen protruding posteriorly from the mass, which naturally leads to the erroneous conclusion that the material is secreted more abundantly from the fore part of the body, whereas the reverse is the case. When the mass has reached the proper length the larva casts its skin, which remains in the hind end of the cocoon, and pushes itself forward into the middle of the cocoon.

Fig. 1.

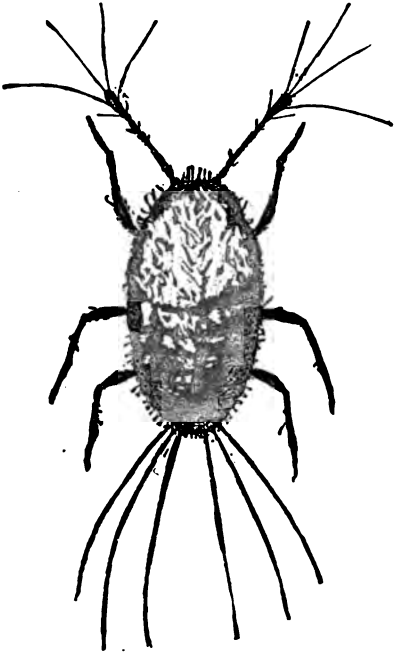
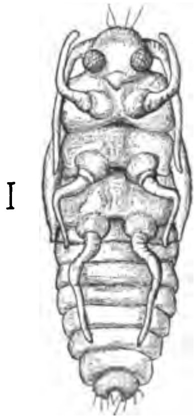


Fig. 2.

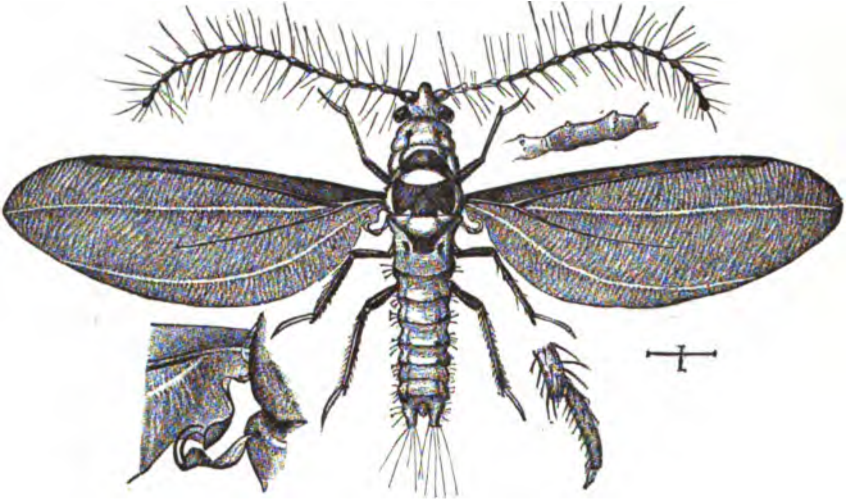


The pupa (Fig. 2) has the same general color as the larva, the antennæ, legs and wing-pads being paler and the eyes dark. It has also the same general form and size. All the members are free and slightly movable, so that they vary in position, though ordinarily the antennæ are pressed close to the side, reaching to basal part of metathorax (ventrally); the wing-pads also against the side, elongate-ovate in form and reaching the second abdominal joint. The legs are rather shorter than the diameter of body, and the front pair thrust forward. The anal end is deeply excavated, the abdominal joints well separated, the mesonotum well developed, and the pronotum tuberculous are with some eight prominences; but there are no other structural peculiarities. The surface is, however, more or less thickly covered with waxy filaments, which are sometimes exuded in sufficient quantities to give quite a mealy appearance.

Whenever the pupæ are taken from the cocoon and placed naked in a tin box, they exude a certain amount of wax, often enough to partially hide them from view. If disturbed, they twist and bend their bodies quite vigorously.

The cocoon is of an irregular, elongate shape, appearing a little denser in the center where the pupa has placed itself, and at the edges delicate and translucent. The material of which the cocoon is composed is very delicate, and appears like the finest cotton, but on submission to a gentle heat it melts as readily as the coarser secretion of the female, and leaves the larva or pupa, as the case may be, clean and exposed.

Fig. 3.



The Adult Male (Fig. 3).—A careful description of the male of this species has never been published. It was unknown to Mr. Maskell at the date of his first paper and has not been mentioned in any of his subsequent papers. Mr. Trimen attempted to breed it, but was unsuccessful. He says:

> So little is certainly known of the males of the Coccidæ that I have kept from time to time a large number of this Dorthesia under glass in the hope of obtaining the males, but hitherto without success. I once, however, found on my window a male of some Coccus which I thought was very probably that of the introduced species, as it agreed in most of its important characters with Westwood's figure of the male *Dorthesia characias*. It was dark red, with the wings gray, and very slender and fragile in its structure. It measured fifteen forty-eighths of an inch across the expanded wings.

The male was unknown to Professor Comstock, but was very briefly mentioned by Dr. Chapin in the first report of the Board of State Horticultural Commissioners, Sacramento, 1882, p. 68. He found the male in numbers during a period of two weeks from September 25, 1881, but did not observe it in 1882. It is also mentioned by Matthew Cooke in his "Injurious Insects," etc., 1883, p. 166, and a rough and uncharacteristic figure is given at Fig. 146, plate 3. His few words of description are: "Male insect, winged; color, thorax and body, dark brown; abdomen, red; antennæ, dark colored, with light hairs extending from each joint; wings, brown, iridescent." The following detailed description is drawn up from numerous specimens both mounted and living:

The adult male is a trifle over 3 mm. in length, and has an average wing expanse of 7.5 mm. The general color is orange-red. The head above is triangular in shape, with the apex blunt and projecting forward between the bases of the antennæ. The eyes are placed at the other apices of the triangle, and are large, prominent, and furnished with well marked facets. There are no mouth parts, but on the under side of the head is a stellate black spot with five prongs, one projecting forward on the conical lengthening of the head, one on each side to a point just anterior to the eyes and just posterior to the bases of the antennæ, and the remaining two extending laterally backward behind the eyes. The antennæ are light brown in color, and are composed of ten joints. Joint one is stout, almost globular, and nearly as broad as long; joint two is half as broad as one, and is somewhat longer; joint three is nearly twice as long as one, and slightly narrower than two; joints four, five, six, seven, eight, nine, and ten are all of about the same length as joint three, and grow successively a little more slender; each joint, except joint one, is furnished with two whorls of long light-brown hairs, one near base and the other near tip; each joint is somewhat constricted between its two whorls, joint two less so than the others. There are no visible ocelli. The pronotum has two wavy subdorsal longitudinal black lines, and the mesonotum is nearly all black, except an oval patch on the scutum. The metanotal spiracles are black, and there is a transverse crescent-shaped black mark, with a short median backward prolongation. The mesosternum is black. The legs are also nearly black and quite thickly furnished with short hairs. The wings are smoky black, and are covered with rounded wavy elevations, making a reticulate surface, a cross section of which would appear crenulate. The costa is thick and brown above the subcostal vein, which reaches costa at a trifle more than four fifths the length of the wing. The only other vein (the median) is given off at about one sixth the length of the wing, and extends out into the disk a little more than one half the wing length. There are, in addition, two white lines, one extending out from the fork of the subcostal and the median nearly straight to the tip of the wing, and one from the base in a gradual curve to a point some distance below the tip. Near the base of the wing below is a small ear-shaped prolongation, folded slightly on itself, making a sort of pocket. The halteres are foliate, and furnished at tip with two hooks, which fit into the folded projection at base of wings. The abdomen is slightly hairy, with the joints well marked, and is furnished at tip with two strong projections, each of which bears at tip four long hairs and a few shorter ones. When the insect is at rest the wings lie flat upon the back.

Rate of Growth of the Different Stages.

The rate of growth of the insect necessarily depends so much upon surrounding conditions, and especially on the mean temperature, that it is difficult to make any definite statements as to time elapsing between molts or that required for other periods of the insect's growth. No facts have hitherto been published which bear upon this point. Mr. Coquillett's observations show that individuals hatched from eggs on the fourth of March cast the first skin on the twenty-third of April, and underwent the last molt on the twenty-third of May. Mr. Koebele also reports a case which bears upon this point, and which is interesting as occurring later in the season. He placed four newly hatched larvæ on a healthy young orange tree, out of doors, August fifth. On September twenty-sixth two of them passed through the first molt. October tenth one more molted, and on October twenty-third the fourth cast its first skin. All left the leaves after molting and settled on young twigs. None of them had gone through the last molt when he left Los Angeles, November sixth. He was afterward informed by Mr. Alexander Craw, of Los Angeles, that nearly all of the insects were full grown in February, and he therefore concluded that the individuals observed by him would not attain full growth before that time.

The mature male larva requires on an average about ten days from the time it begins to form the cocoon before assuming the pupa state, and the pupa state lasts from two to three weeks. The more reliable information we have been able to obtain would show that at Los Angeles the average number of generations each year is three.

Habits.

The newly hatched larvæ settle upon the leaves and tender twigs, insert their beaks and imbibe the sap. On passing into the third stage they seem to prefer to settle upon the smaller twigs, although a few are found upon the leaves and still fewer upon the larger branches and trunk. The adults, however, almost invariably prefer the trunk and largest branches. The insect is rarely found in any of its stages upon the fruit.

The species differs markedly from most coccidæ in being active during the greater part of its life, though most of the traveling is done by the female immediately after the third molt, and by the male just before settling to make his cocoon. At these periods they wander up and down the trunk and larger limbs until they find some suitable place, when they settle down, the male to pupate and the female to insert her beak and develop her eggs and their characteristic waxy covering. She is capable of slow motion even after oviposition has commenced, but rarely does move unless from some exceptional cause. In thus settling after their last wanderings both sexes are fond of shelter, and will get under any projecting piece of bark or under bandages placed around the tree, the male often creeping under clods of earth. Both the female and the male, in adolescence, are most active during the hotter parts of the day and remain stationary at night; but the perfect or winged male is rather sluggish during the day, usually remaining motionless on the under side of the leaves of low plants or high trees, in crevices of the bark, or wedged in between females on the tree. There seems, in fact, to be a well-marked attempt at concealment. The recently developed individuals are found abundantly on or under clods of earth near their pupal cocoons, and they issue most numerously during the latter part of the afternoon. They are at first weak, awkward, and ungainly, and instinctively seek some projection on the tree or elevation on the ground from which to launch on the wing.

At the approach of night they become imbued with a very high degree of activity, and dart rapidly about on the wing. At such times they swarm around the infested trees. In September and October Mr. Koebele noticed that the males began their flight about five o'clock, and as soon as it was fairly dark they again settled down to rest. None have been observed flying at night, and none have been attracted to the electric lights.

Remedies for Its Suppression.

Probably no insect in the State has been the subject of so many remedies, and we will only enumerate some of them here. The principal ones contain caustics, whale-oil soap, and oil, especially kerosene. The caustic solutions with soap we have recommended for deciduous trees, and have obtained fair results with the following: One fourth pound of concentrated lye, one fourth pound of whale-oil soap, to one gallon of water. Before treating the tree, cut off the tops down to the main branches and burn them.

Evergreen Trees.

Although, as spoken of before, this insect is liable to infest almost all kinds of vegetation, it is especially from evergreen trees that it has been found difficult of dislodgment, covering as it does every part of the tree, and, owing to the dense foliage of the orange trees, it has been found impractical, even by several sprayings, to get rid of the insect.

The difficulty with the complete extermination of this insect is therefore chiefly to reach it with the solutions. To this is added the peculiar nature of the egg-sacs, which repels liquids to a great extent, and protects the eggs from destruction. Besides this, however, the peculiar wandering habit of the insect, and its capability of surviving in the very young state for many weeks, renders it extremely difficult of total extermination, and must account for why it hardly ever has been exterminated when once well located. In dealing with this insect, therefore, the above point must be considered, and the utmost caution be taken to not allow a single individual to escape. Without the utmost care no kind of remedy will be entirely successful.

In Los Angeles a large number of solutions have been and are used with more or less success. Among these that of Mr. Compere, which contains some kerosene, and that of Mr. B. M. Lelong, given under the head of the *red scale*, are thought favorably of.

With sulphide of soda and whale-oil soap solutions, used as recommended under the head of *Aspidiotus perniciosus*, good work has been done.

One of the most promising kinds of solutions, in my opinion, is, however, that of resin. The following formula was recommended by Professor Riley, having been experimented with and found quite effective by his assistant, Mr. A. Koebele:

> One pound of caustic soda is dissolved in one and one half gallons of water; then the two pounds of resin and one pound of tallow is dissolved in one quart of the lye. After the resin is all well dissolved by moderate heat, the lye is added slowly while cooking under continued stirring; the mixture, if good, will become dark brown and thick. Should it become whitish and flocky (this is caused by too much and too strong lye), water should be added and it will become right again. This will make twenty-two pints of soap, for water should be added to make that amount, after the lye is in, at a cost of 11 cents, excluding labor and fuel in preparing it, which amounts to but little, and will be sufficient for forty-four gallons of wash sprayed well.

Another proportion of resin solution, which we have seen tried with success on the *A. perniciosus*, may prove equally effective:

> Sixty pounds of resin, sixty pounds of tallow, ten pounds of commercial potash, dissolved in ten gallons of water; ten pounds of caustic soda (98 per cent), dissolved in ten gallons of water. Dissolve the resin and tallow, add the caustic water slowly; after the mixture is made, add ten gallons of water. Proportion used, one gallon of mixture to ten gallons of water; use warm.

Whatever solutions are used the greatest care should be exercised to prevent the insects from reascending the tree. For this purpose tight-fitting bands smeared with a sticky substance, like printers' ink mixed with molasses, have been employed. It must, however, be stated that in no case extermination of the insect by washing has followed (to our knowledge), except where the tops of the trees have been cut off and the bare limbs washed. We recommend this heroic treatment when the insect makes its appearance in a new district.

Gas Treatment.

The difficulty of reaching every part of a tree in full leaf being obvious, treatment with gases was thought of a number of years ago. At the meeting of the Fruit Growers' Convention, in Sacramento, in 1881, Mr. John Wheeler read the result of his trials with bisulphide of carbon, which seemed very favorable. The report was accompanied by a letter from a prominent fruit grower in Santa Barbara, indorsing the remedy.

It seems, however, that further trial did not corroborate the first results, and the remedy was dropped. For a number of years no attention was given to gas remedies, a perfect deluge of different kinds of solutions being tried. In the year 1886 the Los Angeles County Board of Horticulture offered a reward for a remedy that would prove an absolute exterminator.

The reward tempted a great many persons, and strenuous efforts were made at a trial in Los Angeles in September, 1886, to capture the prize; but even the best remedies, which those of Messrs. Lelong and Compere seemed to be, failed to accomplish the desired result.

Being convinced, after seeing the trial, that solutions never could be made to fully eradicate the *Icerya* on a tree in full leaf, I concluded to give the bisulphide of carbon a trial again, and invited Mr. Wheeler to make a test of it in San Rafael. I regret to say that our experiment did not satisfy our expectation, as the dose of one pound of bisulphide of carbon administered to a five-foot high orange tree, the gas being confined in a tent for one hour, failed to kill all the insects, while the majority of the eggs were, after a few days' examination, found to be alive. Treatment for a shorter time was in proportion even less successful, and we concluded that the result did not justify further experiments. For some time Messrs. Coquillett, Craw, and Wolfskill, of Los Angeles, had been experimenting with gas, and in the spring of 1887 announced that they had discovered a gas which had proved an exterminator. Various public tests were made both on the *Icerya* and *Aspidiotus aurantii*, with varying success, enough to indicate that a valuable gas had been discovered which, if rightly applied, would be much in advance of solutions. For some reason or another, the inventors did not push the enterprise very rapidly, and people vitally interested in getting rid of the *Icerya*, becoming anxious, commenced experimenting with various gases. Not meeting with the desired results, principally for the want of chemical knowledge, some enterprising growers concluded to apply to the Agricultural Department of the University of California for a chemist, and Mr. F. Morse was detailed by Professor Hilgard to make test. The result of his experiments are given in a bulletin from the University, which we copy in full:

THE USE OF GASES AGAINST SCALE INSECTS.

Some time ago the Agricultural Department was requested by Messrs. A. B. and A. S. Chapman, Mr. L. H. Titus, and Mr. J. C. Newton, prominent orange growers of Los Angeles County, to conduct experiments with the view of determining the efficacy of certain gases as insecticides—with special reference to the white scale (*Icerya purchasi*). The following is a summary of results, of which a full report will be published hereafter:

The use of gases for this purpose has been long contemplated, and various appliances have been suggested for the ready application of any efficacious gas. The ease with which gas penetrates to all parts of the tree naturally suggests its use as preferable to washes, which at best leave many parts of the foliage and infested branches untouched, even when sprayed with the greatest care. In order that the gas may be an efficient insecticide, it must be so poisonous that even when applied in small quantities it produces fatal results; for in the application the air confined in the tent covering the tree dilutes the gas to a great extent. Again, the gas must be capable of being generated quickly in sufficient volume. The record below shows that only one of the gases employed fulfilled these conditions to a satisfactory extent. Preliminary experiments with some others having shown their unfitness for the purpose, either on account of expense or because of injury to the foliage, or imperfect action on the insects, their study was not pursued further.

Appliances for Application.

The tent for covering the tree is made of heavy bed-ticking, thoroughly oiled with linseed oil. This cloth serves the purpose best, as it is very closely woven, is pliable and easily folded.

The support of the tent, devised by Mr. Titus, is a very ingeniously contrived scaffolding mounted on wheels, which serve to move it from one tree to another. Its dimensions are twenty-six feet high, with a base twenty by twenty feet. Its upper part is twenty by twelve, and carries upon the top a roller made of galvanized iron (six inches in diameter and twelve feet long), upon which the tent is rolled when taken from the tree. Side guy-ropes are attached to the bottom of the tent and run through pulleys at the upper corners of the scaffold. They are used to open the tent when it is to be dropped over the tree, and to fold it up when it is removed. The lightness of the apparatus allows of its being easily removed by two men, who operate the whole. If necessary, two or more tents can be handled by the same scaffolding, one tent being left over the tree while the scaffolding is moved to the next.

In adjusting the tent, the bottom is placed on the ground about three feet from the tree and covered with earth. This brings the gas to bear upon the base of the tree and the surrounding soil.

The generator in which the gases were produced consists of a heavy sheet iron cylinder, eleven inches in diameter and thirteen inches high. The bottom rests on a plank, and to the top is fitted a movable cover suspended in a frame by a bench screw. Into the cover are fitted two pieces of gas pipe—one for the exit of the gas toward the tent, and the other, connected with a pump, carries the gas which returns *from* the tent. Two small reservoirs are also inserted in the cover; in these are contained the solutions which are to flow into the generator for the production of the gas.

In order to establish circulation and to force the gas into the tent, a pump is used, which also serves to exhaust the gas from the upper part of the tent and to force it again through the generator. It is proposed to replace the pump by a small fan-blower, which is much more expeditious than the common pump which was used.

The Gases Experimented With.

Among the gases used were chlorine, sulphureted hydrogen, ammonia, carbon bisulphide, carbon monoxide, carbonic acid, hydrocyanic acid, and carbolic acid vaporized by heat.

Chlorine.—Some preliminary experiments were made in small vessels into which this gas had been introduced. Some infested branches were allowed to remain in them for times varying from five to thirty-five minutes, without any noticeable effect being produced on the insect. Atmospheres more strongly saturated with the gas proved fatal to the insect in a short time. In other treatments extending over eighteen hours, with less saturated atmospheres, only a small percentage of the insects was killed. No decided effects were noticeable on the foliage unless the gas was very concentrated.

Carbon Bisulphide.—A lime tree twelve feet in diameter of top was treated with the vapor of two and one half pounds of sulphide of carbon for forty-five minutes. At the end of this time the insects were lively, and during the treatment had crawled up and collected around a rope surrounding the tree, at the point where the gas was being injected from the hose. It proved that the gas thus used injures neither the insects nor the foliage. It is upon record, however, that in cases where the vapor has not been thoroughly diffused, but was allowed to flow down from an open vessel placed in the top of the tent, serious injury was done to the foliage at points where the undiluted vapor flowed down.

Sulphureted Hydrogen.—Several treatments with this gas were made on a small scale, the application lasting from five to thirty-five minutes. The effects produced either with diluted or concentrated gas were similar to those produced by chlorine, except that even the concentrated sulphureted hydrogen did not injuriously affect the foliage. An experiment in which a whole tree was treated in the tent for forty-five minutes with quite concentrated sulphureted hydrogen gas showed clearly that the effect was far from being satisfactory. The insects for the moment were stupefied, but in the course of an hour and a half the majority of them were again moving about.

Ammonia.—The vapor from one pound and a half of strong ammonia-water was applied to an eleven-foot lime tree for thirty minutes. The results were disastrous to the foliage. The leaves were all scalded, and in a few days all dropped from the tree, and even the newer growth of wood was injured. The insects, however, were not perceptibly harmed.

Carbon Monoxide.—Very strong hopes have been entertained by many for the successful application of this gas. Its apparent cheapness and easy production, when the necessary plant is once erected, would recommend it. Unfortunately our experiments show that it is not sufficiently effective to warrant its use. The gas was obtained by forcing air through a small furnace filled with red-hot charcoal, care being taken to cool and to measure the gas before applying it. No appreciable effect was noticeable after forty minutes. In a duplicate experiment, in which the charcoal was more strongly ignited and continuously introduced into the barrel for thirty minutes, only slightly better results were obtained.

Oxalic Acid.—It was thought that the production of carbon monoxide by decomposition of oxalic acid by heat might be substituted for the previous method of generating this gas. One quarter of a pound of oxalic acid was ignited, and the gases applied in a manner similar to that of the preceding experiment. Neither the insects nor the foliage were harmed in the least. This experiment has incidentally shown that the vapor of formic and oxalic acids, also produced during the heating of the latter, is likewise ineffective.

Carbolic Acid.—It has been suggested that carbolic acid vaporized by heat would prove fatal to the insect. A dose of half a pound of liquid acid was volatilized in the furnace, and the vapor blown in the vessel containing the infected branch. At the end of twenty minutes all the old insects were still alive, and some of the young ones, just molted, were moving about. An hour later the foliage appeared as if scalded.

Hydrocyanic Acid.—It was only with hydrocyanic, or prussic acid (generated by the action of sulphuric acid on potassium cyanide), that sufficiently fatal effects were secured to warrant a more thorough determination of the time of exposure and quantities of material which would produce the best results. Numerous experiments were carried on for this purpose, and it was shown that even small amounts were effective. It was also shown that even in these small quantities an injurious effect upon the foliage was produced. In the beginning of the experiments, "mining cyanide" of potassium was used. It is a very impure material and contains along with the cyanide a considerable amount of carbonate of potassium. For this reason many of the first treatments were practically ineffective.

Later treatments with pure cyanide were more successful in destroying the insects, but the foliage was proportionally injured. Treatments varying in dose from four to twelve ounces of cyanide, and in time from fifteen to sixty minutes, showed that the effect produced on the foliage by longer treatment was not proportionally greater than that produced by short treatment. Neither was the effect of longer treatments proportionally more fatal to the insects. It was thus clearly shown that the gas mixture should be of considerable strength in order to insure rapid action.

The effect of the gas was so disastrous to the foliage that it became necessary to find some means of remedying this trouble. This was sought in supplying a second gas, which might preserve the foliage. Sulphureted hydrogen was therefore injected into the tent, together with the cyanide gas, both from the same generator; a portion of the sulphureted hydrogen being introduced before the cyanide was generated. It was found that the insects appeared stupefied when the tent was raised, but large numbers revived in a few hours. The effect of the cyanide seemed, therefore, to have been decreased by the sulphureted hydrogen. The foliage was not preserved, although not so badly affected as by treatments of cyanide alone.

Carbonic acid gas was next tried. Trees were treated with larger doses of cyanide than heretofore used, and the carbonic acid from one and one half pounds of carbonate of soda was at the same time introduced with these doses. The insects were killed, and the foliage of a twelve-foot tree remained unharmed, while that of a fourteen-foot tree, with the same amount of carbonic acid, was slightly injured. Thus it was shown that it would require one and one half pounds of bicarbonate of soda to preserve tree tops twelve feet in diameter, and that with this protection the deadly cyanide could be successfully used.

The regulation of the doses for the different sized trees so as to produce uniform treatments, is calculated on the basis of the results of the experiments which determined the amount of each constituent for a twelve-foot tree. The following table indicates the amounts for trees of different dimensions of top, based upon the rates of cubical contents:

Size of Tree, Feet.	Cyanide of Potassium, Fluid ounces.	Bicarbonate of Soda, Pounds.	Sulphuric Acid, Fluid ozs.	Size of Tree, Feet.	Cyanide of Potassium, Fluid ounces.	Bicarbonate of Soda, Pounds.	Sulphuric Acid, Fluid ozs.
4	.7	.05	.4	13	25.4	1.90	13.5
5	1.6	.11	.3	14	31.6	2.50	16.6
6	2.5	.20	1.3	15	39.2	2.92	20.7
7	4.0	.29	2.1	16	47.5	3.55	25.2
8	6.0	.44	3.1	17	57.5	4.23	30.1
9	8.5	.63	4.5	18	67.7	5.05	35.8
10	11.5	.87	6.2	19	70.9	5.93	42.1
11	15.5	1.14	8.2	20	90.5	6.93	49.2
12	20.0	1.50	11.6				

In order to apply the doses easily they are prepared so that the required amounts of each ingredient can be directly measured. The cyanide solution is prepared by dissolving say ten pounds of the solid salt in about two and one fourth gallons of water, warmed nearly to the boiling point, stirring at intervals, cooling, and then diluting to two and one half gallons. This solution will contain about one ounce of cyanide of potassium to two and one half fluid ounces of the liquid. The bicarbonate of soda is pulverized finely and measured off in a vessel marked so as to designate pounds and fractions of a pound of the solid material. It is then placed in the generator and the dose of cyanide mixed with it, and, if necessary, a little water added, to make it into a thin paste. After adding the measured dose of sulphuric acid, the pump is worked slowly at first, and more rapidly after the gas has passed into the tent. The time for each treatment must be determined by future experiments. Fifteen minutes seemed to be quite sufficient when the cyanide alone was used, but it may be desirable to extend the treatment to thirty minutes when the foliage is protected by the carbonic acid gas.

It is advisable that the treatments should follow cultivation after about forty days, so that all weeds and places where the insect may find lodgment would be destroyed. The insect will then be on, or very near, the tree. The fitting of the tent to the ground is thus also much easier.

The eggs of the insect remained apparently uninjured, wherever protected by the woolly covering. A second treatment, to destroy such as may afterward hatch, will therefore be necessary.

It must not be understood that these experiments definitely settle the mode of operation and the size of the doses to be used. They are merely suggestive of a general plan which can be so perfected in the future that the application of this remedy to other kinds of trees and insects must be attended with good results. It simply remains for the ingenious cultivator to devise the necessary appliances for its use, on a small scale, on all sorts of fruit trees, shrubs, and plants.

It must not be forgotten that extreme care in the handling, both of this deadly gas and of the cyanide itself, is necessary. To inhale the one, or to taste, or touch a wound with the other, may lead to serious consequences.

F. W. MORSE.

BERKELEY, June 12th.

Since the return of Mr. Morse, he has been requested by the Board of Supervisors of Los Angeles County, through the action of Mr. A. B. Chapman, to renew his investigations and settle more definitely the modus operandi.

It is to be hoped that the matter of gas treatment will be so simplified that the danger of using a gas as deadly as cyanide of potassium will be very much reduced. This Mr. Morse expects confidently to do.

Leaving aside the question of artificial remedies, we turn to the question of natural enemies. Unlike most injurious insects, the *Icerya* seemed almost blessed with immunity from natural enemies in all the counties where it has proved a dangerous pest. True, the larva of a lace-winged fly (*Chrysopis*, sp.) has been found to attack it; also, has a red mite been observed, by Mr. A. Koebele, to devour the eggs.

Lastly, Professor Riley, during last year's observation, discovered a small chalcid fly, which may prove of benefit.

How much we may expect from this latter insect remains to be seen, but it seems almost a foregone conclusion that an insect of as destructive a nature as the *Icerya* must have formidable enemies in its native home. As mentioned before, the question of the original home of the *Icerya* is one of dispute, as the following correspondence to Professor Riley and myself shows, but we hope eventually to settle the question; in fact, we propose to follow it up as far as possible:

LETTER TO W. G. KLEE FROM MR. W. M. MASKELL.

THE MUSEUM, WELLINGTON, NEW ZEALAND, March 5, 1887.

DEAR SIR: I much regret that I can give you no more certain information as to the original home of *Icerya purchasi* than this: That New Zealand is certainly not its home, and that Australia probably is. It came to New Zealand about the year 1877, and first appeared in Auckland upon a hedge of prickly or (kangaroo) acacia, an Australian plant. When I first saw it there, in 1878, it had almost destroyed the hedge (which was about twenty yards long), and the insects were clustered in hundreds on the dying plants. I did not know then as much as I do now about coccids; but I advised the owner strongly to burn every stick of the hedge. He neglected my advice. At that first visit *Icerya* was on that hedge alone, as far as I could see. I visited Auckland again four years afterwards or so and *Icerya* had then spread over a large area about the city, and was on numbers of different plants. Since then it has invaded with terrible effect a great part of the north island of New Zealand, and the warmer parts of the south. It is now firmly established and the supine carelessness of the people allows it to ravage whole districts at will. But it is certainly, as the above shows, not a native of New Zealand.

I understand that it appeared at the Cape of Good Hope some years ago (long before it was established in this country), and that the people there called it the "Australian bug." As the course of traffic by Ira is usually from the Cape to Australia, I suppose it must have been taken there by people going to the diamond fields from Sidney or Melbourne.

In 1880, I think, I was on a visit to Melbourne and took a run for a day up to Ballaarat. There I saw, on various trees in a garden, numbers of coccids, which I believe to have been immature *Icerya*. I was not in a position at the time to bring away any specimens, nor even to make more than the most cursory observation. But if these were not *I. purchasi* they were something very closely allied to it.

On the whole, from the above facts, I feel convinced that Australia is the country which has made to us, and to you, a present of this remarkably objectionable pest.

I am bound to say that I have never seen the *Icerya sacchari* of Mauritius alive. I have received specimens in spirits, and they do not agree with *I. purchasi*. But might there not be two species in Mauritius?

If so, the exportation of sugar from that island to Australia, to the Cape, to California, and to New Zealand, might well account for *Icerya purchasi* in all these countries. I have several times tried to obtain some information from Mauritius, but without effect.

Now, as to natural enemies. As far as our experience goes, *Icerya purchasi* has none such in this country. The only coccids which I have found attacked by parasites here are some lecanids (chiefly of the genus tenochiton), one or two diaspids and a dactylopius. Birds do not eat *Icerya*, and, in fact, we have nothing here to check its increase, to my knowledge. Whether the hymenopterous parasites of tenochiton will some day attack *Icerya* cannot now be said; but everybody will devoutly hope that they may, and soon.

I shall have great pleasure in forwarding to you a copy of a work now in the press on New Zealand coccids, which will be out, I hope, this month. If it were not too importunate I would venture to ask of you to send me whatever publication of the same kind you could easily let me have from California.

I remain yours faithfully,

W. M. MASKELL.

[Written for the "Rural Press" by PROF. C. V. RILEY, U. S. Entomologist.]

I have just read with a great deal of interest the letter of W. M. Maskell to State Inspector Klee, in your issue of the seventh instant. This letter really brings up quite an important question, so far as our white or fluted scale is concerned. In an article in my forthcoming report as United States Entomologist, of which I have sent you advanced page proofs, I have, without question, assumed that *Icerya purchasi* Maskell was a good species and distinct from *I. sacchari* Signoret, because Maskell, in his second article on the former species (Tran. New Zealand Inst. for 1883, page 140), after an examination of specimens of *I. sacchari*, sent him by Signoret, says that he finds the "Mauritian species undoubtedly and markedly distinct." This letter to Mr. Klee brings up, however, the whole question of the accuracy of his determination. He admits that he has never seen Signoret's *I. sacchari* alive. The only difference which he made in 1883 between *I. sacchari* and *I. purchasi* are as follows: *I. sacchari* does not seem to form an ovisac with longitudinal grooves, nor does the body of the insect, although somewhat hairy, show the great tufts of black hairs and the curious projecting glassy tubes springing from large brown coroneted bases which are marked features of *I. purchasi*. The number of circular spinneret orifices are much smaller in the Mauritian insects.

Now, Signoret knew only two stages—the full grown female and the newly hatched larva—while Maskell gave careful descriptions of the egg, the young larva, the second stage, and the full grown female, but had not seen the male larva, cocoon, or adult. It is for this reason that I have given a very full characterization of the species in the article already alluded to.

Signoret's description, so far as it goes, applies thoroughly well to *I. purchasi* in some of its forms. His female had not formed the cottony or fluted egg covering; at least he makes no reference to it. His figure, while showing a short truncated mass, does not indicate the flutings, because the few lines upon it are evidently intended by the artist for the long, fine, glassy hairs. Maskell, following Signoret's description, rightly says that *sacchari* "does not seem to form an ovisac with longitudinal grooves." But Signoret himself says that *sacchari*, in the Island of Bourbon, "is confounded with *Lecanium gasteralpha*, under the name of louse-with-the-white-pocket." Whether Signoret assumed such confounding by the islanders because of erroneous supposition that this *sacchari* had no ovisac, or whether the islanders designate both the *Lecanium* and the *Icerya* under the characteristic vernacular, is not plain from the language, and it is immaterial. On the principle of unity of habit in the same genus, I feel morally sure that Signoret's *Icerya* must produce her eggs in such an ovisac, and the Bourbonese are doubtless well aware of the fact, otherwise they would not so indicate it or confound it with *Lecanium*. We are justified in assuming that the female which my friend Signoret described and figured had only just begun forming its sac, and that its flutings had become effaced and the secretion unnatural in appearance. Maskell's second reason, viz., that *sacchari* "does not show the great tufts of black hairs and the projecting glassy tubes," will also lose force from the facts that Signoret particularly describes these glassy tubes as "long filaments, waxy, very fine, delicate, transparent," and that these tufts of black hairs are extremely variable in quantity, sometimes making the insect look quite dark and bringing out in strong relief the few smooth, orange red or brick red elevations, and particularly the series of about twenty-two around the border; at other times being so scarce that the insect has an almost uniform reddish-brown appearance.

It would appear, therefore, that notwithstanding the differences in Signoret's and Maskell's characterizations, there is yet room for grave doubt as to the specific difference in the two insects, especially as upon restudying Signoret's description it accords in every other particular with *I. purchasi*.

You will pardon me, I know, for going into these technical details, because it is evident that the solution of these questions has a very important bearing. My own impression now is that future investigation will prove that the two insects are identical. The truth will in time be ascertained by getting all the different stages of *sacchari* from the Island of Bourbon or of Mauritius, and comparing them more carefully with *purchasi*, the different states of which I have fully detailed in my report.

Let me say in this connection that there is a great variability in *purchasi* as to the amount of matter secreted on the scale itself, which may very easily mislead, especially in dried specimens. In the orange groves of Southern California the general colorational aspect of the insect is, in all its stages, reddish-brown, the surface exudation being rarely excessive and never obliterating the reddish-brown color. This exudation is, in fact, more noticeable upon the male larva, which, together with his narrower, more elongate form, renders him easily distinguishable from the female. In the more northern parts of the State, however, I found that the general colorational aspect was quite different, owing to the greater excess of the surface exudation, frequently covering the body in little globular masses and giving it a whitish and even greenish aspect, and often rising along the middle of the body into a tufted ridge. This form corresponds more nearly with what Signoret has described, and it follows that this waxy surface exudation becomes denser and still more noticeable by contraction in the dried or cabinet specimens, or whenever the insect has shrunken.

This question of the synonomy of the species bears directly on its original source, for if we have but one species of the genus, or even if there be two, and *I. purchasi* is found to occur on the sugarcane in the Islands of Bourbon and Mauritius, then the presumption will be that it originally came from these islands. In my address at Enterprise I called attention to the fact that this fluted scale seems to have become notably injurious almost simultaneously in Australia, South Africa, and California, and on the assumption that it infests the sugarcane on the islands mentioned, it is much more easy to understand its introduction to the other countries. Sugar is exported from those islands into many parts of the world. The sugar, as it leaves those islands, is very coarse, and all the molasses or syrup is not extracted, centrifugals not being in use. For the purpose of draining, the sugar makers are in the habit of putting a piece of cane in every hogshead, and, in addition, the top is sometimes covered with pieces of cane. In point of fact, I am informed that an insect known in the trade as the sugar louse is of quite frequent occurrence in such sugar, and Professor Wiley, of the Department of Agriculture, upon being shown specimens of *Icerya purchasi* (and he is quite familiar with the so called sugar louse), informed me that he thinks them identical.

On this hypothesis the initial spreading point is from the island referred to, and the insect probably made its way first to Cape Town and thence to Australia, New Zealand, and California. This does not preclude the possibility of its importation on other plants, but I think it highly probable that the chief method of distribution of an insect which is so tough as to bear long survival without food was upon sugarcane in sugar hogsheads, as it could be much more safely carried in this way than upon living plants. The determination of the original source of the pest is of vital concern in any study of its parasites, as such would be more apt to be found in its native country than in any countries of its introduction.

I have been quite anxious to settle definitely this question of its original home, and have lately had some correspondence with parties in Australia, New Zealand, and Africa. The following extracts from such correspondence will prove of interest to the people of California. Mr. Kirk's statement will add weight to the hypothesis that I have ventured, while Baron von Mueller's statement also strengthens it. It may perhaps be impossible at this late date to definitely settle the question of this original source, especially as there may have been not one but several introductions (indeed we have evidence that such was the case) into all three of the countries in which it now occurs; but we can much easier understand its travels if it started as a sugarcane insect. I have italicized those parts of the following letters which particularly bear on the subject of this communication.

The sketch of the dipteron which Mr. Crawford found attacking *Icerya* shows a great likeness in the body to some hymenopterous encyrtid; but the wings indicate its dipterous character, and that it belongs to the dolichoponidæ near diaphorus. So far as their larval habits are known, these flies are predaceous and live in the larva state in the ground. Perhaps Mr. Crawford has used the term "parasitic" synonymously with "predaceous," but I will not further anticipate what Miss Ormerod may report.

EXTRACTS FROM CORRESPONDENCE.

The following are the extracts from the correspondence to which reference is above made.—EDS. PRESS.

Letter from Roland Trimen, of Cape Town, to Professor Riley.

As regards the evidence as to the Australian habitat originally of this insect, I regret that I have nothing to add to what has been already supplied to you. * * *

Since the Commissioner's report in 1877 the orange industry of the western districts has suffered most severely, scarce, very inferior, and exceedingly dear fruit being now only obtainable where it used to be abundant, good, and cheap. Where, however, the kerosene and alkaline solutions have been constantly applied by individual proprietors here and there, the result, as I am informed by Mr. MacOwan, Director of the Botanical Gardens, has been very encouraging. In the eastern districts the effects of the *Icerya's* attacks do not seem to have been nearly so serious, but whether this is due to a less suitable climate and other conditions, or to more vigilance and exertion on the part of cultivators, I cannot at present determine.

The bug spread to Natal within the last few years, and last year I received specimens from them found on the common black wattle. Only yesterday I was sorry to receive a lot found there on the orange.

No public action in the matter has been taken since the Legislative Assembly, in 1877, threw out the attempted legislation on the subject.—*Roland Trimen, South African Museum, Cape Town, Cape of Good Hope, February 8, 1887.*

F. S. Crawford, Adelaide, to Professor Riley.

* * * Last year I entirely lost my colony of *Icerya*, owing to the attacks of a fly. A rough tracing of an unfinished drawing of the same I also forward. I know nothing about the diptera, and should be obliged if you can determine the insect from the drawing. I may say that I sent Miss E. Ormerod specimens of the fly about two months back,

but of course have not had time to hear what she makes of it. This is the only instance I know or have read of, of a true dipteron being a coccid parasite. * * * —*Frazer S. Crawford, Surveyor-General's Office, Adelaide, South Australia, February 21, 1887.*

From an Article by E. J. Dunn, in Melbourne Argus, August, 1886.

I desire to call attention to a species of coccus known as Dorthesia. This destructive pest was first observed on the Island of Bourbon. Thence it spread to Mauritius about twenty-five years since. In Mauritius it destroyed the orange and lemon trees, many of the ornamental shrubs and acacias, and wrecked most of the beautiful plantations and shrubberies. At Port Louis it still exists in loathsome masses on the handsome Talipot palms.

About twelve years ago it was noticed for the first time in the Botanical Gardens, Cape Town, and most probably arrived there from Mauritius with plants sent to the Botanical Gardens. During the first summer it spread about three miles into the suburbs along the railway. Its fearfully destructive character now became evident, for the orange trees, the Australian wattles, the pittosporums, and the blackwoods became loaded with this disgusting parasite, and the trees slowly but surely succumbed to its attacks. * * *

All trees of the orange kind, such as lemon, citron, shaddock, etc., proved especially suitable food for the Dorthesia, and once a tree became infested, no amount of syringing or washing prevented its destruction. The disastrous results of its arrival at the Cape are all too evident.

Formerly in Cape Town itself, and throughout the suburbs, the orange tree lent a charm to the gardens that no other tree could give; and in the Western Province orange growing formed a most important source of wealth, many farmers netting several hundreds a year from their orange groves. Some of these groves, planted by the Huguenots and their descendants, were of great age, and, beside being profitable, were objects of great beauty. Those of the Pearl, French Hock, and Wagonmaker's Valley were especially famous.

To-day this is all changed, and, except for a few dead stumps, these fragrant groves and this valuable asset in the country's wealth have disappeared.

Not so the Dorthesia; it is still advancing steadily and leaving destruction in its wake, and will continue to do so as long as suitable food is within reach. * * *

Letter from Baron von Mueller, of Melbourne, to Professor Riley.

* * * I beg to inform you that the *Icerya purchasi* (or a closely allied species), although occurring on *Acacia mollissima* and some congeners in the Colony Victoria, has not attacked here (so far as I can learn or had occasion to observe), destructively attacked the orange orchards. I will, however, make further inquiries, as well in this colony as in New South Wales, South Australia, New Zealand, and let you know the results.

Possibly the *Icerya* develops more readily in a moister clime than that of Victoria, and thus becomes more mischievous in California than here.

The introduction of this destructive insect into your States by means of acacia seems to me very unlikely, because the various species of acacias are so easily raised from seeds that no one will think to introduce them by living plants. Moreover, it could not have been the Acacia latifolia, which was the host of the Icerya, because that species is a native only of the north coast of Australia, and as yet nowhere existing in horticulture. Acacia armata certainly is grown for hedges, but always raised from seed, chiefly obtained from North Australia. It seems, therefore, more likely that when acacias are grown anywhere, they would afford, particularly in humid climes, a favorable opportunity for the *Icerya* to spread. A similar circumstance occurred in Ceylon, and another in some parts of Brazil, where an indigenous insect plague became aggravated when eucalyptus, on which that insect preferably seized, became reared. * * * Whether the *Icerya* was originally an inhabitant of Victoria or merely immigrated, I will endeavor to ascertain; but such a subject of inquiry is surrounded with difficulty now, after half a century's existence of the colony, particularly as the *Icerya* drew no attention here by any extensively injurious effects on any cultivated plants, though it may have caused on some plants minor or transient injury. * * * —*Ferdinand von Mueller, Melbourne, Australia, March 21, 1887.*

Letter from L. M. Kirk, of Wellington, New Zealand, to Professor Riley.

On returning from a protracted tour of forest inspection in the south, I find your letter of twenty-second December awaiting reply. My friend Baron von Mueller is mistaken in supposing that I have written recently on the *Icerya purchasi*. In a report on fruit blights printed two years ago, I drew attention to the pest, intending to treat at greater length at an early date; but my duties as Forest Conservator have prevented the intention from being carried out.

The insect is a native of the Fiji and other Pacific Islands, from whence it has migrated, probably, with orange trees, to Australia, New Zealand, and California. Mr. Maskell states, I believe, that it is a native of Australia, and was introduced from that country on mimosa plants; but this is an error, and acacias are rarely or never introduced as living plants, owing to their being so readily propagated from seed.

The *Icerya* is abundant in the northern and middle parts of the Auckland district, and usually prefers citraceous fruits; it is, however, found in large quantities upon some of the wattles, evincing a decided preference for the silver wattle (*Acacia dealbata*). It is, however, occasionally found on furze, manuka (*Leptospermum scorparium*), peach, and apple, but on these fruits only in small quantities, and not, so far as I am aware, doing serious damage; in fact it is only found upon these plants when growing in the neighborhood of infested citrads. It is occasionally found on a few native trees, but it is not causing any great injury.

It is also found in Napier and other parts of Hawk's Bay, on the eastern coast of North Island, and in Nelson and the northwestern corner of the South Islands. It is also said to be found in Canterbury, but I have no direct evidence of its occurrence in that district.

It is not found either in Taranaki or Wellington, in the North Island, except Nelson and possibly Canterbury.

There can be no question that it is a serious foe to citraceous fruits and wattles. In the vicinity of Auckland, and in many other parts of that district, it is abundant. I have seen trees greatly injured by its ravages, but cannot say that I have seen any killed. At present, orange culture has not attained large dimensions here, but there can be no question that *Icerya* is the worst foe our orange growers will have to encounter.

I have not seen an acacia killed by this pest, although the under surfaces of branches are frequently covered. In a few established orange grounds, the yield of fruit is materially diminished by the ravages of this insect.

No official documents have been published respecting the *Icerya*, except the fruit blights report already mentioned, of which a copy of a Queensland reprint is inclosed herewith. The Forest Department has purchased Mr. Maskell's "Account of Scale Insects," and is about to publish the same with colored plates; a copy shall be forwarded as soon as it leaves the press. * * * —*L. M. Kirk, General Crowns Land Office, Forest and Agricultural Branch, Wellington, New Zealand, March 25, 1887.*

Since reading the above, I have taken steps to procure from the Island of Mauritius, all the possible information bearing on the sugar louse and specimens of it for comparison with our insect here.

Selandria cerasi, the pear or cherry slug, is found nearly all over the State. It has proved very troublesome, especially in San Mateo, Santa Clara, and Alameda Counties. In the last county my attention was called to it in San Lorenzo and Haywards. Many cherry trees looked as if they had been burned. Unfortunately the damage that could be done was almost accomplished before the time of my visit. The leaves were all bereft of their fleshy part. A complete defoliation of a tree prematurely is very injurious, and should be prevented, if at all possible. An early spraying with the summer wash, before recommended by us, accomplished, in Berkeley, the most satisfactory results. The eggs of this insect are laid on the leaves and are covered with a fine white film. For two successive seasons here we have succeeded in killing both the hatched larvæ and the eggs by one spraying.

On nursery stock dusting with lime or ashes may be the most economical, but for a large orchard requiring three or four applications, because it does not kill the eggs, it is a tedious and expensive job.

The saw fly of the pear tree (Nematis similaris).—The larvæ of this insect is met with in many counties. It is easily destroyed with a soap wash.

The Notodonta concinna (red humped caterpillar).—The larvæ of this moth is a curious, conspicuous-looking creature. In Sonoma, it is doing considerable harm to various trees. Evidently it has two broods in the season—perhaps three—as I saw it there in July and specimens of the larvæ again, were sent to me this fall. The insect is well known in the East and is well described by Harris. As it has not been mentioned here in any previous report we take the liberty of copying from him. The eggs, from which they proceed, are laid in the month of July, in clusters on the under side of the leaf, generally near the end of a branch. When first hatched, they eat only the substance of the under side of the leaf, leaving the skin of the upper side and all the veins untouched; but as they grow larger and stronger, whole leaves from the point to the stalk, and go from leaf to leaf down the twigs and branches. The young caterpillars are lighter colored than the old ones, which are yellowish brown, paler on the sides, and longitudinally striped with slender black lines; the head is red; on the top of the fourth ring there is a bunch or hump, also of a red color;

along the back are several short black prickles; and the hinder extremity tapers somewhat, and is always elevated at an angle with the rest of the body, when the insect is not crawling. The full grown caterpillars measure one inch and a quarter, or rather more, in length. They rest close together on twigs when not eating, and sometimes entirely cover small twigs and ends of branches. The early broods come and leave the trees by the middle of August, and the others between this time and the latter part of September. All the caterpillars of the same brood descend at one time, and disappear in the night. They conceal themselves under leaves or just beneath the surface of the soil, and make their cocoons, which resemble those of the unicorn (*Notodonta*). They remain a long time in their cocoons before changing to chrysalids, and are transformed to moths towards the end of June or the beginning of July. Mr. Abbott states that in Georgia these insects breed twice a year, the first broods making their cocoons towards the end of May, and appearing in the winged form fifteen days afterwards. This *Notodonta* is a neat and trim looking moth, and hence is called *concinna*. It is of a light brown color; the fore wings are dark brown along the inner margin, and more or less tinged with gray before; there is a dark brown dot near the middle, a spot of the same color near each angle, a very small triangular whitish spot near the shoulders, and several dark brown longitudinal streaks on the outer hind margin; the hind wings of the male are brownish or dirty white, with a brown spot on the inner hind angle. Those of the other sex are dusky brown; the body is light brown, with thorax rather darker. The wings expand from one inch to one inch and three eighths.

As they maintain their gregarious habits during their entire larval state, they can be gathered or destroyed either by cutting off the limbs they are on or by jarring the branches. Should they be present in large numbers, almost any kind of soap mixture sprayed on them will destroy them.

The canker worm, for several years a source of trouble to the fruit growers of Alameda County in the vicinity of San Lorenzo and Haywards, has, by the persistent efforts of the people, and still more by the increase of its parasites, almost disappeared. The mode of fighting this insect was the same as that used in the Eastern States, namely, the placing of bands, smeared with greasy material, around the trunk, to prevent the wingless females ascending the tree to lay their eggs.

Megachile circularis*, leaf cutting bee, is indigenous to the drier interior parts of the State, and I noticed it in various places, as in San Jacinto Valley. Its work is very easily recognized by the peculiar circular pieces which the female cuts out of the leaves with its saw-like apparatus in the abdomen. These pieces it uses for its nest. As the insect lives solitary in the ground, thorough cultivation of the soil where it builds has proved a satisfactory remedy.

The red spider, or mite, is an insect widely distributed, and too well known to need any description. It is found especially troublesome on almonds and Petite prunes, but occurs on almost every species of fruit trees. Sulphur washes are the best remedies for this pest, and should be applied during the growing season when the mites are active. To destroy them in the egg state during winter I have found impossible, even the strongest lye remedies, so fatal to scales, having failed. Cold water sprayed during the summer has proved a very good remedy to keep them down. In various sections, where the mite was formerly troublesome, it has either entirely disappeared or is not felt. This seems to indicate that it has natural enemies here. The mite is found in all orange growing sections, and when scarcity of water prevails, affect the orange visibly. On the other hand, when water is plentiful, it does not seem to do any damage. This has been my observation, both at San Diego and at Riverside.

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* Or an allied species.

Thrips.—In several localities where hot, dry weather prevails, this insignificant looking little insect affects the foliage quite seriously, although in Pleasant and Vaca Valleys, where it is mostly found, its presence is not greatly noticed. The remedies against this insect are sulphur washes, similar to those used against the red spider. The insect is generally spread with hothouse plants, and people receiving these should scrutinize them closely before setting them out in the garden. The general effect of the thrip is to wither the leaves, those affected showing its presence by their pale, blotched appearance.

Diabrotica (12) punctata.—Twelve-spotted *diabrotica* in a number of counties in the northern part of the State has proved a serious pest. This is particularly the case in part of Santa Clara, Contra Costa, and Alameda Counties. Until we know the exact life history of this insect, we cannot suggest any satisfactory remedies. Judging from the habits of nearly allied species, we must conclude that the larvæ feed on roots of certain plants. We have, for the purpose of observing their habits, inclosed a large number of these insects with plants, of which they seem fond, and hope that by the coming spring something more of the habits of the larvæ may be known through this experiment. Meanwhile, we must satisfy ourselves with the partial remedies at our disposal.

For freeing nursery stock, take early in the morning, before the beetle has become active, a pan of water, with kerosene floating on top, out in the garden. There pass your hands over the young trees, as if you would strip them of their leaves, another person holding the pan in position to let the insects drop into it. In this manner, large quantities can be killed.

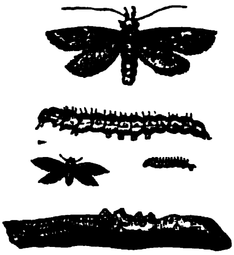
On orchard trees, it has been more difficult; the common method, smoking, only driving them from place to place. The most efficient remedy, though quite expensive, has been spraying the trees with buhach early in the morning or at night. This will not kill the insect, as has been stated, but it will fall stupified to the ground, and thus, if a canvas be spread beforehand on the ground beneath the tree, they can be gathered up and destroyed, either by burning, or by throwing them into water, in which a little kerosene has been placed.

Anarsia lineatella, peach moth, or *strawberry-root borer*, which of late has become quite a serious pest in our orchards, has likely been imported on strawberries, on the roots of which it feeds in the Eastern States. I am not aware that it has proved anything troublesome to the strawberry growers, although it is possible that it does some damage. It must not, however, be confounded with the borer generally infesting strawberries in this State, which lately has been determined by Professor Riley to be the larvæ of a clear-winged moth (*Aegeria impropria*). (H. Edwards.)

As the insect demands general attention, we have deemed it well to have an illustration of it, copied from Saunder's "Insects Injurious to Fruits," from which we also take an account of its habits in the Eastern States.

When occurring in great numbers, this insect is very injurious, playing sad havoc with the strawberry plants. The borer is a small caterpillar, nearly half an inch long, and of a reddish-pink color, fading into dull yellow on the second and third segments; the anterior portion of the second segment above being smooth, horny-looking and brownish-yellow, like the head. On each segment there are a few shining, reddish dots, from every one of which arises a single, fine, yellowish hair. The under surface is paler. This borer eats irregular channels through the crown, sometimes excavating large chambers, at other times tunneling it in various directions, eating its way here and there to the surface. If examined in the spring, most of the cavities will be found to contain a moderate sized, soft, silky case, nearly full of castings, which doubtless has served as a place of retreat for the larvæ during the winter.

Early in June, when mature, the caterpillar changes to a small, reddish-brown chrysalis, either in one of the cavities excavated in the crown, or among decayed leaves or rubbish about the surface, from which the moth escapes early in July.



The moth is very small, of a dark gray color, with a few blackish-brown spots and streaks on the fore wings. The fringes bordering the wings are gray tinged with yellow. The moth lays an egg on the crown of the plant late in July or early in August, which soon hatches; the small caterpillar burrows into the heart of the plant, and remains in one of the chambers during the winter, occupying one of the silky cases referred to. The channels formed by the larvæ through the crown and larger roots of the plant soon cause it to wither and die; or, if it survives, to send up weakened and almost barren shoots.

This insect does not limit its depredations to the strawberry; the larvæ is also found boring into the tender twigs of the peach tree and killing the terminal buds.

In the figure we have a representation of the larvæ and moth, both of the natural size and enlarged; also of an injured peach twig.

This insect is known to attack the peach tree in Europe, whence it has probably been imported to this country.

It is seen that the insect is subject to parasites. This may account for its disappearance in localities, and then again its presence; although the tendency seems to be that it is gradually spreading over the State. In several localities it has been so bad that half of the peach crop was infested.

In Dr. Chapin's report of 1883, Mr. W. H. Tucker, of Folsom, is made the authority for the statement that it has been observed for sixteen years in Pleasants and Vaca Valleys. Five years ago it was first noticed on the University grounds. Young growing apricot shoots were found withering at the ends, and upon examination the larvæ were found in them. All the branches showing these signs were cut off and burned. After careful search I found only two branches the next season, and since then they have not been seen here. Evidently parasites must have greatly helped us, otherwise we should never have been so easily rid of the pest. The peach moth requires more study before it will be possible to indicate the best line of defense against it. The larvæ are found under the bark of the tree, but from its habits as a root borer it is plain that some of them must harbor in the ground. It will be well to clear the trees of all of their rough bark in winter. In the spring all young twigs showing their presence by wilting should be removed and burned. Where the insect has not yet been known the strictest caution should be observed against bringing any fruit boxes from sections known to be infested.

The Woolly Aphis.

The following report on this subject was written by me, chiefly, while still in the orchards of the University experimental grounds, and appeared as a bulletin from that institution. My subsequent observations have but strengthened my opinion as to the value of resistant stock:

Among the many diseases to which the apple tree is subject, none is as persistent and hard to eradicate, and more widespread than the woolly aphis (*Schizoneura lanigera*). The home of this pest seems to be obscure. In England it is supposed to have come from America, and there it goes under the name of American apple blight. It is found in France and Germany; and wherever met, is regarded as one of the most formidable of pests. The Chilian Consul of San Francisco stated several years ago, that in Chili it had destroyed whole forests of the wild apple.

It seems almost unnecessary to describe this pest, unfortunately so common, yet a few words to novices in horticulture will not be out of place. In form, the woolly aphis resembles closely the green aphis, so common on roses and other plants; but its color is reddish brown, and when crushed it yields a red juice, hence the German name *Blutlaus*, or blood louse. The insects are always surrounded by a whitish woolly substance, hence the name "woolly" aphis. Like all alphides, this species increases with astonishing rapidity, and only a few need be left on a tree to soon spread all over it. While the presence of the woolly aphis makes itself so conspicuous above ground, on the branches, covering them as if with snow, yet the most serious trouble lies out of sight, at the roots, which in our dry climate they inhabit as freely as they do the branches, sapping the vitality of the tree to such an extent that the fruit becomes small and valueless. If allowed to go on unchecked, the trees gradually die. To the apple tree the woolly aphis is what the phylloxera is to the grapevine, sucking and causing swellings and knobs all over the roots, as well as at the root crown.

A pest as serious as this has, naturally, been long fought, and many are the remedies suggested for its extermination. When young trees first become infested, and it is discovered in time, a number of remedies may be effectively used.

Rubbing or brushing kerosene on the infested spots, or washing them with lye, three fourths pound to the gallon, or with strong solution of whale-oil soap, or sulpho-carbonate of potassium, may effectually arrest the disease. When, however, the roots of a large tree once become thoroughly infested (and in this State, unfortunately, that requires but little time), almost all the remedies usually recommended prove wholly insufficient, and on a large scale impracticable. For a number of years we have tried at the experimental grounds of the University various remedies, including tobacco decoction, hot water, common lime, ashes, bisulphide of carbon, and several proposed remedies of unknown composition, furnished by outside parties. Of the latter, that of Mr. Lille, of San Francisco, appears, so far, quite promising; we must, however, reserve our judgment for some time yet.

Gas Lime.

On a whole, we have found no remedy as inexpensive and efficacious as gas lime—the refuse of gas works. Outside of its penetrating odor this material has but one objection; it is a strong medicine that must be used with care, and the dose must be regulated somewhat according to the soil and subsoil, and the age of the trees. There is necessarily some difference in its strength, according to its freshness, as it gradually loses some of its ingredients by exposure to the air, and especially to rain. Nevertheless, when applied to a given spot, it will retain its efficacy for at least three years. Our first experiments with it began four years ago, and at the convention held in San Francisco that year I made my first statement in regard to this remedy. I stated that a marked effect had been produced by it, and that the aphis had been killed, but that in spite of the very strong dose applied to each tree (something like ten pounds), the insects were again descending to the roots. I stated, also, that some of the trees on shallow soil had been killed by the gas lime, and that on the whole, the remedy was not satisfactory. During the succeeding spring and summer, however, I gained fresh confidence in it, as, with the exception of very weak trees or of those in shallow soil, comparatively few died, those less injured showed returning vigor. The gas lime had also been very beneficial to the soil, causing the heavy, stiff loam to pulverize like ashes. The next season, after the first rain, I noticed the peculiar, strong odor of the gas lime. Examination later on, in the spring, showed that the aphis was not to be found about the roots, and existed right at the surface only. It evidently had not gained any headway. Altogether, the remedy now looked so promising that it was decided to give it a trial on a larger scale, but in much smaller doses; these, if proving sufficient, to be increased the next year. The call to take charge of the collection of plants for the New Orleans Exposition prevented me from carrying out my intentions at the time, and it was not until the past season (1885-6) that experiments properly guarded could be made.

The bad effect of the first application was to corrode the bark on the younger trees, causing it to decay. Instead of removing the soil and putting the gas lime in close contact with the tree, as was done the first time, there was spread about a shovelful and a half, *i. e.*, about two or three pounds in a dry state, within a radius of four feet over the surface around the tree, trusting to the rain to wash it into the soil. To prevent the aphis from remaining close on the root crown, fresh ashes, a few shovelfuls to each tree, were piled close about the trunk. The work was done early in October, and the copious rains of this season gave good opportunity for action.

On the trees examined thus far, the result has been very satisfactory. They show, by the knots and swellings on the roots, that they were once badly infested; still, there is no aphis on them now, while on a few other trees left without treatment the insects are crowded. Two rows of trees treated several years ago and now treated again, but having had no ashes placed about them, show the aphis working downward again. To make the work complete, therefore, it seems necessary to use ashes or some similar material close about the root.

The dose of gas lime to be given to a tree should vary according to its size and age, and the nature of the soil. In a porous, deep soil, there is less danger of injury than in a clayey one, where the water charged with the antidote permeates the soil very slowly, and has time to corrode the bark. In the case of some old trees in the Santa Cruz Mountains treated last season according to our suggestion, although the gas lime had been put right on the roots after the soil had been taken away, the roots were perfectly sound and all the aphis killed. The soil was a sandy loam, underlaid by limy sandstone. Thus, the exact dose to be recommended is a little difficult to determine. It is always safe to use a small dose first—from one shovelful on a small tree to four on a very large one, spread over the surface, according to the spread of the root, will generally be found right.

It should be stated that a thorough treatment of the top was never made, because we wanted to see how far we could depend upon the ladybug for extermination there. From observations during the past few years, I believe that in this locality this useful little beetle can be depended upon for keeping the crown of the tree free from aphis. We cannot recommend too highly the protection of the ladybugs (*Coccinellæ*). During more than one year, we have seen them completely annihilate the aphis above ground in a very few days. It is generally stated that their larvæ are the most destructive to the latter. We ourselves have witnessed what an enormous quantity of aphis the fully developed ladybug will consume. As the *Coccinellæ* hibernate on evergreen trees, I very strongly recommend the planting of these trees (conifers, especially) around the orchard, to give the necessary shelter. I have often seen them congregated on the Monterey cypress in such quantities that they could be taken up by the handful. Should the ladybugs not appear in numbers sufficient to exterminate the aphis, it may be necessary to kill the latter by means of washes. As it is impossible to accomplish this with one spraying on badly infested trees, I recommend two or three sprayings. This should be done in the following manner: For the first application use hot water of 140° Fahrenheit, in the tank, sprayed with great force. This will wash off the greater number of the insects. For the second application take tobacco water and whale-oil soap in the following proportions: In a decoction of tobacco (one gallon water to one half pound tobacco) put half a pound of whale-oil soap. Apply this mixture at about 130° Fahrenheit; in about a week give another similar application. If early varieties of apples are in question, leave out the whale-oil soap, as, especially in a cool climate, the odor of the whale oil will not leave the fruit.

Resistant Stock.

There is a vast difference in the many varieties of apples as regards their resistance to the woolly aphis. The late John Llewellin, of Napa, claims to have found, by experience, that seedlings of Golden Russet and Rawle's Janet are exempt. We have no personal experience in the matter; but for several years, at the experimental grounds of the University, we have had growing two apple trees of an unnamed variety, propagated and donated by John Rock, of San José. Although purposely and repeatedly infected with the woolly aphis, these insects never remained either on the top or on the roots. The latter are tough and wiry, and perhaps for this reason resist the aphis, much as the wiry grape roots resist the phylloxera. The only manner in which this resistant variety can now be propagated is by grafting. Although healthy, these trees have been of rather slow growth. From observation in a number of orchards I find the Smith Cider to be very little subject to the woolly aphis. As the tree is a strong grower, it would be worth while to try seedlings from it as grafting stock. The seed should, however, be gathered from orchards where several trees of this variety of apple are growing together. This will insure more of the true character of the Smith Cider. Doubtless there are among the many varieties of apples others equally resistant, and it would be well to pay close attention to this point.

Polycaon confertus (twig borer) is a small chestnut-colored beetle, which is doing considerable damage to young growing trees all over the State. It is described in Matthew Cooke's "Insects Injurious to Orchards," but has only been mentioned in the reports of this Commission. This beetle is a native of this State, and was found, many years ago, by the late Dr. Le Conte feeding on a white oak. Upon showing it to him while he was in Berkeley on a visit, six years ago, he expressed surprise to find it at work in a plum tree. He had not seen it since his discovery of it. Unlike other borers, this beetle bores in its adult state, cutting down into the one-year old twigs below a bud, and tunneling in for a number of inches into the wood. In the month of June I have often seen it engaged. It is particularly damaging to the olive tree; and the original importation by the late B. B. Redding was almost destroyed by it. At Professor Hilgard's place, at Mission San José, they were very severe on young olive trees. In the Santa Cruz Mountains young apple trees are the chief ones attacked by them. Their work is by no means fatal to the tree; but unless proper pruning and attention be afterwards given it will spoil their shape, at least. My practice has been, whenever finding them, to remove the affected branches below the burrow of the beetle, provided the branch can be removed without harm to the tree. When it would be difficult to replace a branch, as is often the case, I should leave it on, but see that the beetle is destroyed, and the entrance of the hole stopped up—this to prevent decay and a weak branch following.

Spraying with soapy mixtures may possibly keep them away. If this be done, it should be attended to in the early part of the month of May.

Chrysobothris femorata (flat-headed borer).—This beetle is widely distributed over the world. It is found in eastern States, as well as here. Although a most serious trouble when its nature is not understood, it can, with proper management, be easily kept in check, and therefore need not be feared. Along the coast, particularly in the wooded sections, it is quite abundant. All the protection I found necessary to exercise against it was the placing of a shake six inches wide on the southeast side of any young trees just set out, and that necessary only for the first year. The second year the trees which were not started higher up than two and a half feet from the ground would by their own shade protect themselves from being burned, therefore also from attacks of the borer, since it is only in bark damaged by sunburn that the insect bores, and only on the south side have I found the entrance of the holes.

In a country with a warmer climate, a shading of the trunk all around for a time sufficient to provide shade is necessary. This can be done either by placing the parts of a shingle split in two at such an angle as to shield all sides but the north; or wrapping the trunk with a sack or straw sufficient to afford shade. The last two modes are liable to the objection that they furnish shelter for many kinds of insects. I have never seen the insect enter the trunk above ten inches from the ground, and it is generally right at the ground. The appearance of the tree will reveal the fact that something is wrong with it. On examination, if the tree be a plum, gum will be found to have exuded where the insect is working, and by cutting into the wood of the damaged parts the white tadpole-like larva will be found.

If a tree has been only slightly attacked, so that half or two thirds of the bark can be saved, it will pay to take care of a young tree. If it go further than this, a tree will never become thoroughly round, and will be outstripped in growth by young trees planted later. This I have learned by actual experience.

Whenever a borer is removed, the debris and dead wood should be entirely cleaned out and the smooth surface left, taking care to preserve the bark as much as possible. Then the wound should be smeared over with grafting wax and a rag tied about it. In this manner young trees have been saved, but unless only slightly attacked they have never done as well as younger trees uninjured.

Insects Preying on Scale Insects.

THE TWICE-STABBED LADYBUG.*

It seems very desirable that all fruit growers should become fully acquainted with the predaceous insects, which must be considered their friends, as it is through their agency that all the worst pests are kept in check, and what naturalists term the "balance of nature" is preserved. Unfortunately, by the propagation of certain trees, the food plants of these insect pests often increase to an alarming extent, and generally so fast that their enemies are far from being able to cope with them. Such has been the case in California for the last few years, and without washing and spraying of the trees with antidotes, many orchards would have been totally destroyed. Gradually, it seems, however, that the law of nature is asserting itself, and parasites and predaceous insects are making their appearance in vast numbers. The Ichneumon flies are making war on the scales and on many other insects. Of the more conspicuous insects, the Syrphus flies have been very numerous; this season their green, blind larva having, apparently, totally annihilated the aphis in the plum orchards, formerly badly infested. The ladybugs have kept them company, and have also destroyed vast numbers of woolly aphis and grain aphis; appearing in many instances, as it seemed, in the eleventh hour, just in time to save the latter from destruction. The lace-winged flies (*Chrysopa*), so conspicuous by their large, delicate wings, and large, lustrous eyes, have appeared in vast numbers, and their larvæ have made havoc with the scale insects. But, perhaps, the most striking acquisition in this line is the so called "twice-stabbed ladybug," the *Chilocorus bivulneris*, whose principal food is the various scale insects.

Some four weeks ago, when in the town of Santa Cruz, I found the *Chilocorus* feeding on the olive scale (*Lecanium oleæ*) on trees badly infested. At Los Gatos they were noticed by me, at Mr. Yocco's place, feeding on soft orange scale. However, the most striking case presented to me was in the Willows, at San José, where Mr. Newhall, the nurseryman, directed my attention to it. We found at an old orchard, five large pear trees, which, by the rough appearance of the bark, clearly showed that they had been once badly affected by scale—in this case by *Aspidiotus perniciosus*. In patches all over the trunk could be seen the mature insect, with its black, shiny body, and two conspicuous red spots, and numerous pupæ still partly covered with the black, soft spines of the larval skin. No live scale could be found, and the last two years' growth was clean and smooth. It was stated to me that the orchard had not been washed for three years, which seemed to point strongly to the conclusion that at least the final subjugation of the scale was due to the ladybug.

Another case in question, the orchard of Messrs. Winton and Webster, in Castro Valley, near Haywards, Alameda County. A number of plum trees were some years ago found to be badly infested with *Aspidiotus perniciosus*, and from them spread to the currant bushes close by, which previously were badly infested with another species of scale, and by the united efforts of those pests a good many were killed. The plum trees were

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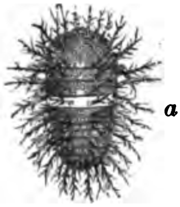
*In Bulletin No. 3, this species was incorrectly described as Chilocorus Cacti, a species it resembles closely.

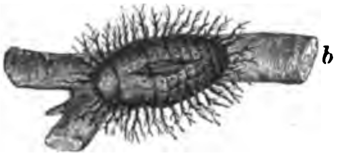
CHILOCORUS BIVULNERIS.

(*Twice-stabbed Ladybug.*)

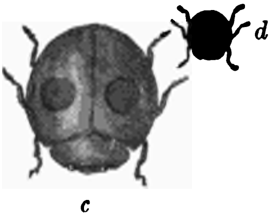
Larva.



Pupa.



Mature Insect.



sprayed with a strong solution of lye, which, although killing most scales, did not kill them all. The currant bushes were not sprayed, but, although showing by the thick coating of dry scales that they had been once fearfully infested, no live scale could be seen on them, while the trees were absolutely clean. In looking around on the trees I found a number of larvæ of *Chilocorus*, as well as mature beetles; and on the currant bushes I found quite a number. On the whole, all evidence indicated that here, also, the ladybugs had been instrumental in killing the scale bugs.

In view of these personal observations, and from the reports of similar experience by different parties in other parts of the State of the good work by this species, or, perhaps, by the closely allied species, the Cactus ladybug, *Chilocorus cacti*, we have caused a colored cut of the insect to be made, which is here appended. These cuts* show the insect in various stages.

The larva is shown magnified at *a;* it is black, crossed by a light yellow band about the middle, and is armed with many soft, long, and branching spines. The pupa, also magnified, at *b*, in the figure, is formed within the larval skin, which splits open along the back sufficiently to show the inclosed chrysalis, which is black, with a few scattered tufts of hairs. The beetle, which is seen magnified at *c*, and of the natural size at *d*, is of a shining black color, with a red spot on each wing case, much resembling the *C. bivulneris*, mentioned above.

Since writing the above I have had an opportunity to see more of the work of the *Chilocorus*, and I am well satisfied that I have not overestimated its usefulness. During the middle of August I paid a visit to Mr. A. P. Logan, at The Willows, and thoroughly examined the whole orchard. There could hardly be found by this time any of the *Chilocorus*, but the remaining pupa skins were present in large numbers. In the whole orchard of several hundred prune trees no scale could be found, but all over the remaining pupa cases of the beetles indicated the presence of the former. On leaving this orchard and passing out into a neighboring orchard, the traces of the ladybug became fewer, and the presence of the red scale more and more marked; and no trees, although by no means bad, could be found free from this pest. This orchard had been sprayed every year.

A few weeks later, when on a visit to Fresno, I was brought face to face with a case similar to that in Mr. Logan's orchard. This was at the place of Mr. J. R. Foster. The trees were but few in number, but all had been very badly infested. But now scarcely a scale insect could be found, while pupa cases of the beetle were everywhere abundant, also a few living insects. The place had just passed into Mr. Foster's hands, and, as near as we could learn, had been neglected for some time. The *Chilocorus* had evidently been left in peace, and had gradually increased until it overcame the scale bugs.

About the end of September, on my visit to Tustin, and while stopping with Mr. H. K. Snow, I found the larvæ and imago of a *Chilocorus* on lemon trees infested with red scale, a pest prevailing in that section; but, although watching the ladybugs closely, I did not discover them in the act of destroying any scales; but the presumption is that they were so well fed that they were resting at the time of my observing them. The presence of the young larvæ at this time of the year indicates that there must have been two broods in the season. How this insect passes the winter, is a question I have not found any answer for yet; but judging from the habit of the common ladybug, it is most likely that they hibernate in the beetle state. This point is of importance, as the grown insect is so readily distinguished, and in case of washes that would easily kill them, they could easily be protected; if, on the other hand, they pass the winter in the larval state, it would be very difficult to preserve them.

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*These are partly borrowed from Professor Comstock's report to the Department of Agriculture, where he described this species, having found it to be a native of this coast.

Other Ladybugs.—The usefulness of the various species of the common ladybug is almost of daily comment, and yet unobserved by the majority. A few good instances will not be out of the way: Each season for the last two years the woolly aphis in Berkeley, feeding above ground, has been literally swept away by the common ladybug. Another instance: The grain all over this section was suffering most seriously from the grain aphis. A choice piece of a new variety of barley was suffering severely; in vain did we try fuming with tobacco applied through a hose connected with a patent squirrel smoker, and operated during foggy weather. Although millions of aphis were killed, yet in a few days the grain was again covered. Once, after an absence of four days, I returned to look at the barley patch, and, to my astonishment, found it free from aphis. All over the grain were myriads of larvæ of ladybugs voraciously feeding. The grain rallied and came through very well. They are, indeed, the farmer's friend, even if they follow up the work of the diabrotica on ripe fruit, thus causing some damage. Without them the fruit trees would teem with aphis, become stunted and covered with smut.

The Lace-Winged Flies (*Chrysopa*) have been mentioned in former reports, and their great usefulness as a scale and aphis destroyer were dwelt upon. These insects are very much on the increase, particularly in the southern counties, and I was informed by Mr. Coquillett, they are the only insects which he has observed preying upon the cottony-cushion scale.

The Syrphus Flies.—The appetite of the blind larvæ of these insects is something enormous. This spring when they were found very abundant, feeding upon the plum aphis, I took home at noon two leaves covered with aphis and with two larvæ on each, and left them on a table. In the evening I examined the leaves, and found nothing but empty skins of aphis. The aphis had all been devoured by the syrphus larvæ, and these were still hungry for more. In Mr. Hubbard's report of insects injurious to the orange we find the following precise and interesting description of the syrphus flies:

Whenever colonies of aphis are found on the orange there will almost invariably be found among them slug-like larvæ, which creep about among the plant lice with a leech-like movement, now contracting into an almost globular mass, and again elongating like the joints of a telescope. The minute terminal joint, which constitutes the head of the larvæ, is observed to possess a pair of retractile, horny hooks, which work forwards and back, in and out of the mouth, like a rake. As the larva advances with a groping motion, for it is quite blind and eyeless, the outstretched head and neck sweep the surface, and the jaws continue their raking movement until they strike the body of an aphis. Immediately the jaw-hooks grapple their unresisting victim, and soon through the transparent walls of the body the sucking stomach is seen pulsating and drawing through the œsophagus, in a continuous stream, the green juices of the plant louse.

When actively engaged in feeding these larvæ continue with the greatest voracity to empty one louse after another, until they have destroyed dozens of them; and their bodies distended with the contained juices become translucent green in color. When filled to repletion, the larva falls into lethargy, lasting two or three hours; during which the processes of digestion change the juices of the body to varying shades of brown, and dark masses of fecal matter gradually form in the intestines. The curious changes of color in the semi-transparent larvæ are therefore due entirely to the condition of the body contents. The full fed individuals usually have a tinge of flesh color, owing to the formation of glandular, creamy masses of fat, which have a roseate hue. When fasting through scarcity of food the fat is absorbed, and the body becomes dark-brown and opaque. When feeding, the larva is translucent green; while digesting, the colors change to olive and brown, with distinct markings of reddish-brown and black.

Transformations.—When full fed, the larvæ attaches itself by means of a pair of terminal prop legs, aided by a viscid secretion which it voids, and which, in drying, glues it to the surface of the plant. The body becomes distended and thickened, losing in length what it gains in girth. The skin of the larva is not split or shed, but hardens and forms the puparium, which protects the true pupa within. In the puparium the shape of the larva is profoundly altered, the body joints are obliterated, the anterior end becomes swollen and broadly rounded, and the form tapers suddenly behind.

The perfect fly issues by pushing off the convex end of the puparium, which splits at the suture between two of the old larval joints, and releases a circular cap in the shape of a watch-glass.

The duration of the egg and larval periods of these aphis-eating flies is short; the egg hatches in forty-eight hours after it is laid, and the larva becomes full grown and forms its pupa in five or six days. About ten days, the average time of insects having many broods, are passed in pupa. The reason of this extremely rapid development in the first two stages—the egg and larva—becomes obvious when we consider how brief is the existence of the aphis itself, and how suddenly its colonies appear and disappear—for the life of a colony of aphis is also very short. Upon the orange the aphis can feed only on the very tender young leaves; in a short time these harden, and then the colony must scatter; but frequently long before that time their numbers are reduced almost to extermination by enemies and parasites. As the syrphus larvæ cannot follow the winged insects, they must make the best of their limited opportunities and feed quickly or perish of starvation. It is curious to mark how nature in the case of these insects has responded to the necessities of the situation and given their larvæ restless activity, great rapacity, and destructive powers, notwithstanding their slow locomotion, and also a remarkably brief egg period, so that this wingless, blind, and almost legless maggot is enabled to compete with more perfectly organized rivals in the food struggle which takes place over every aphis colony.

Broods, etc.—The larvæ of these syrphus flies feed only upon aphis, and depend upon them for their existence. They therefore appear and disappear with the colonies of the latter, and the broods may be supposed to follow rapidly one upon another during the seasons of growth, when the appearance of new shoots upon the orange gives support to numerous colonies of aphis.

The seasons of growth in the orange, after the renewal of the foliage in the early spring, depend in a great measure upon the prevalence of rains, and vary from year to year, but are usually three or four in number during the year. The colonies of aphis, and likewise their syrphus enemies, are most abundant in June and September.

Three representatives of the family *Syrphida* are found among aphis on the orange. They belong to the genus *Baccha*.

Some of the Fungoid Diseases Affecting Our Deciduous Fruits.

The following paper was read at the Fruit Growers' Convention, in Sacramento, November, 1886, and afterwards published as Bulletin No. 5, but only one thousand copies being printed, which are all exhausted, we republish in this connection:

The peculiar climate of the coast of California, especially that of those sections within the more direct influence of the fogs of the ocean, offer specially favorable conditions for the development of injurious fungi, popularly known as rusts, smuts, mildews, and blights, which, as cultivation extends, seem to increase, and cause serious loss, if not total destruction of our crops.

Nature of Fungi.—The study of fungi, at least of the lower and most destructive forms, does not date very far back. Owing to their minuteness of structure our knowledge of their character is due to the microscope, without the aid of which they cannot be scientifically determined. The number of species and families of fungi is very great, and, in fact, the difference in size between the smallest and largest is as great in proportion as it is between the tiniest herb and the giant of the forest. But with all their great differences they have, of course, certain points in common, which separate them from higher plants, although some of these characters are shared by ferns and lycopods. I refer to their mode of reproduction. Before entering upon the discussion of the separate kinds it may be well to review the characteristics of this function. The organs of reproduction—that is, the spores, analogous to seed—in the higher fungi, as the toadstool, are contained in the most conspicuous part of the organism, which we see above ground. That which answers to the stem and root of the plant combined is below ground, or feeding on the object that supplies its nourishment, by sending its minute threads through the tissues, is known as the myceltium. To become a true resting spore, which, like the seed, can remain dormant for seasons, until favorable conditions for its development are offered, a certain process, analogous to the fertilization of the pollen on the egg of the flowering plant, is necessary. But these resting spores are not necessary during the time of the most active growth of the fungi. Then spores, which may be compared to bulblets, such as are produced by the onion and lily, are developed, and these seem to possess the power of indefinite multiplication. It is this power that explains the very rapid development of fungi, and renders them particularly destructive. It seems evident that nearly all the blights, so called, troubling our fruit trees, are due chiefly to some sort of fungus, which has gradually spread. This will account for the fact that orchards of certain varieties of fruit, once bearing sure crops, are now very uncertain, and often failures.

Fusicladium dentriticum.—The first species of fungus to be discussed, because, perhaps, one of the most serious, is the black pear and apple smut, the *Fusicladium dentriticum.* Mention of this can be found in older horticultural works, although nothing very definite. Robert Hogg, in his "Manual of Fruits," says of the so called fox whelp apple, that it may be known by its peculiar scabby spots (a figure in the book shows this), but adds that this is not a distinguishing mark of this apple, being in reality the effect of a species of fungus, *Spilocæa* pome*, which affects other apples as well. The disease then cannot have been considered anything formidable, as no further mention of it is made.

In "du Breuil Cour d'Arboriculture" is described a disease which undoubtedly is the same as the previous one in question, affecting certain varieties of pears, causing black scab on them and rendering them unsalable. It further says that sulphur has been tried as a remedy, but without success. The report of the German experimental school at Geisenheim on the Rhine speaks of the *Fusicladium* affecting the white calville apples seriously, and says that sulphur dusted five times over the apples had counteracted the disease, and also records that these sulphured apples, compared with others not sulphured, were little affected by the codlin moth.

In 18— Professor Trelease, of the University of Wisconsin, published a very interesting paper, in which he demonstrates the fact that the fungus or blight of the foliage of the apple is identical with the smut causing the scab on the fruit.

Comparing the effect of the fungus on the fruit and foliage there can hardly be any doubt that it is the same fungus that affects both pears and apples, and that the so called blight of the Winter Nelis pear is due to an aggravated form of *Fusicladium*, or rather, the Winter Nelis, more than other varieties of pears, is subject to this disease. In endeavoring to prove this, it will be necessary to review the history of this blight.

Ten years ago nothing was heard of this trouble. Winter Nelis bore and matured in many places on the coast where they are now being abandoned as a failure. About five years ago, I noticed at the experimental orchard of the University the leaves of two trees in the extreme southwest corner of the orchard during the month of May, becoming smoky looking, revealing under the magnifying glass a smut-like fungus. The trees produced but little fruit, and most of this was badly affected with the same smut. The warm weather dissipated nearly all the signs of the fungus, and it was not until next season that I discovered it again on the foliage of the same trees, as well as on six or eight adjoining pear trees, attacking the latter in precisely the same manner as it had the first variety, affecting foliage and fruit as well. Next season again I was astonished to find, after a few days' absence, that the same blight had made its appearance in all parts of the orchard, affecting some varieties very severely, others less, and some not at all. It was the same year that the blight of the Winter Nelis was so general, as most people remember. This year, according to Mr. J. McLaren, of San Mateo, was the first year the disease was noticed in San Mateo County, and this year, also, in the Santa Cruz Mountains that the so called apple tree blight proved very severe. In fact, from every quarter within the region of the fog belt, complaints of this blight were heard of.

This season, I determined, if possible, to reach some definite conclusion in regard to the nature of the blight as reported from various quarters, and from a thorough comparison I am satisfied that the *Fusicladium dentriticum* is the cause of all the trouble. In the experimental garden at Berkeley, we have had all grades of it on the pears, and on one variety, the first attacked, the bloom is affected precisely as in the case of Winter Nelis, and the consequence is that the fruit does not even form. The branches of this one (see figure) when young are attacked by the fungus, and the second year reveals the damage done. This is shown on another branch in the figure, the counterpart of which I have found in several orchards, notably in an eight-year old orchard near Watsonville. This orchard, although otherwise in an apparently healthy condition, has failed to bear at all.

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* This is the old name of the *Fusicladium dentriticum.*

In the case of the White Winter Pearmain, we have in the cracked bark peculiar to this variety abundant protecting places for the resting spores, which carry the disease over from year to year. Most probably the spores, seating themselves under the scaly bark, are protected from such changes of atmosphere as are brought with the dry north wind, that destroyer to all forms of fungi. On the smooth branches of other varieties comparatively little opportunity for the lodgment of resting spores is presented, and the time of blooming has passed before any great number of spores have developed, so the harm that is done does not show itself until the young fruit has advanced a little, while on the other hand, varieties seriously affected have sufficient spores present to destroy the bloom.

Experiments at Berkeley.

Having read of the good results of the application of sulphate of iron on certain mildews, we determined to spray with it. The results produced were not favorable; when used strong enough to affect the fungus, it affected the foliage and fruit also. One pound to forty gallons was the strongest solution that could be used on the trees in foliage without hurting the latter seriously; used stronger, it had the effect of checking the fungus and the fruit and foliage at once. Even with the solution one pound to forty gallons of water, the foliage suffered and the fruit dropped. Next season the sulphate of iron was used early, before the leafing out, one pound to thirty gallons; and again, weaker, after the foliage was out. The season proved unfavorable to the development of the fungus, being a warm, dry spring. Still, the disease showed itself on such trees as were much subject to the disease, proving that the wash had but little effect. Professor Riley's kerosene and sour milk emulsion was also tried partly as a scale exterminator. It proved, likewise, of little use as a cure for any of the complaints. The following season, spring of 1885, substantially the same compound, used the succeeding season so successfully, was used again, but applied cold. It produced favorable results, but not enough to be called successful. A great deal of scabby fruit could be found, the spring also being very dry, and the comparatively healthy looking fruit we attributed to this favorable condition. The season of 1886 brought out the fungus in full force again, this time showing itself all over the experimental orchard.

Successful Remedy.

The sulphide of soda with whale-oil soap prepared as follows: "Dissolve thirty pounds whale-oil soap (80 per cent soap, at the most costing 5 cents per pound) in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye is what we have used) with six pounds of sulphur and a couple of gallons of water. When thoroughly dissolved it is a dark brown liquid (chemically sulphide of soda). Mix the two, the soap and the sulphide of soda, well, and allow them to boil for about half an hour; then add about ninety gallons of water to the mixture, and it is ready for use." This was applied warm at the temperature of 130° F. in the barrel from which it was sprayed. The remedy this time proved a decided success, and with the exception of the variety first attacked years ago, only such fruit as had not been covered with the solution was affected the least. Such varieties as for years, and even last year, a favorable season, had suffered so severely that they were almost cracked to pieces, were perfectly smooth.

Sulphur mechanically mixed with soap had also been tried several times before in the shape of the so called codlin moth wash, but its effects when used in this locality had been nothing. Reports from sections with a warmer summer temperature show better results. It seems, therefore, that in a cool climate, when sulphur simply is used it does not develop the vapor sufficiently strong. But the sulphide of soda, especially when the compound is used warm, gives a brisk action and the germs of the *Fusicladium* are killed.

As the varieties of fruits suffering from the *Fusicladium* are affected in very different degree and at different time of development, some apples and pears being attacked already in bloom, it is evident that they cannot successfully all be treated alike.

According to this theory we have arrived at the conclusion that the different varieties, affected in different degrees, require different modes of treatment.

Varieties of which the bloom already affected is not allowed to set.—For these I should recommend a very thorough spraying in the fall, and also in the spring before the blooming, and if the fruit should show signs of fungus spray again after the setting.

Varieties blooming and setting before the fungus attacks them.—One thorough spraying after the fruit is set.

The appended figure, No. 1, shows the work of the fungus on a Winter Pearmain apple. *a*, the fruit in its natural size; *b*, a blotch enlarged; both show plainly the rapid spread of the fungus destroying the tissue of the apple. The center is black with millions of growing spores; the circumference still shows the remnant of the epidermis. Such an apple will eventually be like the scabby fruit so often seen.

FIGURE 1.

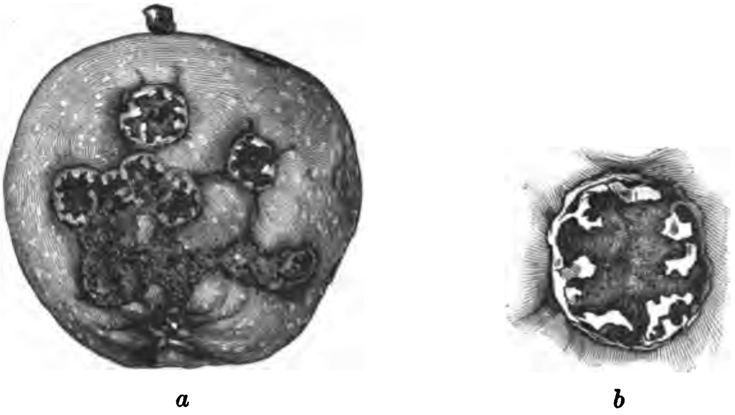
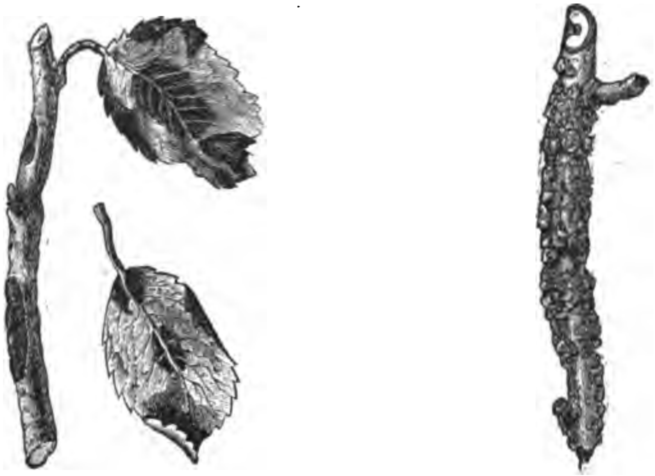


Figure 2 shows the effect of the fungus on pear branches. *a*, is a young one-year old twig, showing the effect on leaf and bark, and similar to that on apples; *b*, a two-year old branch, shows the disease in its secondary stage, such as can be seen in a badly affected Winter Nelis tree.

FIGURE 2.



a b

It should be distinctly understood that we do not claim to have proved that the sulphide of soda is a perfect remedy for the Winter Nelis blight, or for apples blighting in bloom, but we think it will prove so. The following remedies are suggested for trial against the latter two afflictions:

Remedies to be Tried.

1. Substitute, in place of concentrated lye or powdered caustic soda, *caustic potash* 98 per cent, now for sale in this city.

2. *Powder of lime and sulphate of copper*, as prepared in France and used successfully against the downy grape mildew. *Perenospora viticola* (see Lambson Scribner's report on fungoid diseases, published by the Department of Agriculture) as follows:

Have the quicklime entirely slaked in the air. Take two hundred pounds of the lime which has first passed through a coarse sieve so as to remove foreign bodies. With ten pounds of this lime and thirty of water make a clear milk of lime. Dissolve twenty pounds of bluestone (sulphate of copper, the purest possible) in sixty pounds of warm water. Let the solution cool to 68–77° F. Mix the solution with the milk of lime, and stir well. The remaining one hundred and ninety pounds of lime is spread out on the hard ground, preferable on stone flagging or concrete, to a depth of about seven inches, and the mixed liquid being placed in watering pot, one man sprinkles the lime with it while another stirs and mixes it by means of an iron rake with very long teeth, then shovels it over and makes it into a heap. Let the powder, which is only moist, dry for some days; roll it after drying, sift it through a fine sieve, and bag it. Two hundred pounds will be sufficient for over two acres of grapes. This powder might be dusted on trees by means of strong sulphur bellows, and should be used shortly before blooming.

3. Liquid solution of bluestone and lime: Fifty pounds of bluestone to two hundred and twenty-five liters, then adding fifty pounds of lime in form of milk of lime. As this makes a too thick paste to pass through a

spray nozzle, it will either have to be put on with a brush, or diluted about one half, when it will pass through a coarse spray.

4. Air-slaked lime has been used successfully by Dr. E. Kimball to counteract the fungus causing scab on apricots. It may likewise prove efficient on the Winter Nelis pear, dusted on at the time of blooming.

Mildew on Peach.—In its effects similar to the fungus just spoken of, we have the mildew affecting the peach and nectarine. Early in the spring it begins on the foliage, and gradually spreads to the fruit. It has been found by experience, and I have verified it, that peaches possessing large globular glands are generally not affected by this complaint. From this it might be argued that we should plant these and avoid others. But it happens that the varieties subject to mildew are not much affected by curly leaf, a disease that seems still more difficult to cure. Sulphur applied early and often—three times have sufficed in a bad climate—will keep down the mildew and allow the maturing of good nectarines, where the same varieties without the treatment would have been ruined.

This summer an experiment of spraying certain peach trees with sulphide of potassium resulted very favorably. The proportion used was one quarter of an ounce to a gallon of water.

On the Causes of the Death of Young Trees During the Spring.

Every year we hear of failure of young trees to grow, but last season the complaints were unusually numerous, and such as to attract general attention. Since first noticing it, I have intended to attempt tracing out some of the causes, and in my travels this subject has been kept in view. From close observation I believe these failures may be traced to one or several combined causes—bad drainage, climatic conditions, or the nature of the trees themselves.

1. *Bad drainage* causes the soil to harden and dry out earlier than natural to the same soil, containing the same elements, but which is naturally or artificially drained. The reason of this is that the poorly drained soil is less porous than the drained, the capillarity of the former having been destroyed by its being too long charged with water. Such undrained soils should never be utilized for orchards, particularly as regards cherries, peaches, apricots, and apples; the first, especially, should be avoided. Plums on plum root may live and bear well in such places—if the case is not bad. Pears will endure the most, especially if the soil should be of a heavy character. Badly drained soils encourage many diseases, and in unfavorable seasons will cause either killing of the young fibrous roots, thus resulting in a temporary arrest of the growth of the tree, if not permanent injury, or actual killing of all the roots; thus, of course, bringing death to the tree.

It is perhaps rare that, under ordinary circumstances, bad drainage alone will cause the death of a tree, but if it be coupled with peculiar climatic changes it will often be a most fruitful cause of death. In this connection, another important point to be considered is that owing to our peculiar, mild seasons, the resting period of our trees is more often governed by the drought than by the cold, and they are liable to take on the habit of such native trees as the wild Buckeye, which goes to rest with the dry season and puts forth after the first soaking rain.

The roots of a tree once started, it is impossible to stop the rise of the sap; indeed, it is through this powerful action that the whole machine is set in motion. To understand its great importance, a few words on the subject of sap circulation will be found of interest.

WHAT GOVERNS THE RISE OF SAP IN TREES.

It was once contended that the foliage of trees by evaporation started a sort of pumping process from cell to cell, reaching to the root; in fact, that the part of the tree above ground, instead of the root parts, started the work of growing. The power of osmose has been made also to account for the various movements of the sap. While the latter undoubtedly plays an important part, it has been proved, not many years ago, that the rise of the sap is caused by a real life power, as it seems, seated in the root, forcing the flow upward with an astonishing power. We are familiar with the bleeding of vines, and notice the rise of sap in our trees, but that the roots exert an enormous pressure has not been known until the interesting experiments by Professor Clark and his assistants at the Massachusetts Agricultural College were published about ten years ago. By inserting pressure gauges in the trunks of trees, such as black birch, sugar maple, and others, it seems that in the case of the black birch that the pressure reached the astonishing figure of a pressure of nearly eighty-five feet. To ascertain with certainty that the pressure was caused by the vital power of the root alone, a pressure gauge was put on a root of a black birch cut off ten feet from the trunk, the gauge being put on the root a foot under the surface. This was done on April twenty-sixth. The pressure at once became evident, and, with slight fluctuations, constantly rose, until the next day it reached the height of eighty-five feet, column of water. This wonderful result showed that the absorbing power of living rootlets is sufficient to account for the most curious and essential phenomena connected with the circulation of the sap.

It is doubtful whether in our climate any of our fruit trees exhibit anything like this pressure from the roots, although the grapevine in the most marked degree exhibits it. This lesser force with ours is due, likely, to the reason that the trees have been more or less active all winter, but at the time of the expansion of the leaves it is much greater.

I have cited the above instance to show how important a part the sap from the root must play, and how important that its supply be kept up constantly. It is through these young fibrous roots, or rather through the minute root hairs upon these, that everything enters the root. If these are killed by any cause, is it any wonder that the tree receives a sudden check, and if foliage and young wood is forming, must inevitably cause the death of the tree?

Now, let us look at the condition that may exist and bring about such an effect. Deciduous fruit trees growing in a soil not artificially supplied with moisture will often go to rest early. Having gone to rest early, they are naturally prepared to begin early again. If, after a warm rain, and consequent soaking of the ground, warm weather sets in, there is apt to be a very early start. The older roots, particularly in a cold soil, having been partially dormant, now begin to put out feeders, or fibrous roots, and simultaneously the foliage is developed, and growth commences. We know that all roots, as well as seeds, require a certain temperature to grow in. Let that temperature be sensibly lowered at the time of its starting and while it is very young, then decay and destruction are sure to follow. The exact temperature at which such disaster will happen depends, of course, on the nature of the tree or seed. Apples, plums, and pears will naturally endure much lower temperature than trees of the warmer temperate zones, as apricot, almond, and peach.

Now, for the past two seasons we have had peculiar conditions of a nature similar to those we have just spoken of. The year previous was dry, and brought about in all the drier localities a naturally early resting period. In February, after the warm, copious rains, we had a warm spell of unusually long duration. This brought forward nearly all kinds of trees, notably the apricots and peaches. Closely following upon this, in March, we had cold weather of considerable severity. It was just at this time that reports were heard from all over the State of the failing of young trees, those one and two years old in particular. What happened here was simply this, I think: The young fibers, which were supplying the new growth, were killed, or partly killed, thus causing a sudden stoppage of the sap-flow and a consequent collapse, the foliage and young parts withering away suddenly. Simultaneous with this report of the condition of trees, my attention was called to some apricot trees in Berkeley dying. On examination, they proved to be on peach root, and while the older roots were alive, all young fibers were dead. The soil is of a very stiff nature, indeed a heavy clay, receiving seepage from the hills above. Several orchards examined near Vacaville were equally as badly situated, and liable to dry out early. Their start naturally then was early. The trees in the vicinity, but more favorably located, all showed the effect of similar conditions by putting out their foliage very irregularly. In fact, the condition of the trees all over the State, on soil more or less unsuitable, showed the result of the check. The almonds, which always start early, managed to get beyond the critical point, as was illustrated at Mr. Ellwood Cooper's orchard. In many localities less early, the almonds, starting later, were caught by the cold March snap at their critical point, while the foliage and wood were very tender; therefore the trees were killed. With apples and pears, these unfavorable conditions allowed only a partial development of the bud and only a partial setting of the fruit—an effect which was noticeable from Sacramento to San Diego. Exceptions to these were orchards in deep, well drained soil, holding sufficient moisture in the previous season to cause growth up to the frosts, or to the approach of cold weather; or where, by irrigation, the same conditions were produced. (We do not hereby mean to imply that irrigation should be applied very late in the season, but just long enough to allow a natural growth with the season, and not cut short by drought.) Instances of the latter kind I have observed in different counties, in Vaca Valley, Pleasant Valley, Santa Cruz Mountains, San Diego County, and in the last named place I have reference to the orchard of Mr. Levi Chase.

While I believe that nearly all the cases of dying trees which have come under my observation may be attributed to the cause mentioned above, yet there seem to be cases where it is difficult to account for the failure of the trees. For instance, a case in Sonoma Valley, in the orchard of Mr. Shaw, who lost a number of trees both this and last year. The year previous to their dying they began to show signs of failing by an unhealthy growth, some of them losing parts of limbs. On close examination of the dying limbs, a minute beetle was found, but its work consisted in a few extremely small holes, not bigger than a pin point. As the little beetle belongs to the dry wood borers, and its work, besides, being so insignificant, I cannot believe for a moment that this has had anything to do with the failure of trees, but is merely a feeder attracted by the dead or dying wood. The same beetle was sent me from Watsonville, where it was found in dead apricot trees. I lean towards the idea that fungoid diseases, similar in nature to the pear blight of the Eastern States, may be at the bottom of some of the trouble. Other cases of trees dying suddenly were mentioned to me by Mr. M. Cooke. It seems here that sudden high rise of temperature was the cause, as the bark of the trees (apricots) was scalded all around, just at the surface of the ground. The days had been extremely warm, and the trees having no leaves, the sun had, presumably, produced this effect.

Remedies.

But what, will be asked, shall we do to alleviate the trouble? We may avoid badly drained land, but such climatic conditions may come as will be impossible to govern. An intelligent fruit grower in Santa Clara County, on seeing his apricot trees withering, cut back the trees very severely. This had the desired effect. It saved the trees, and after two years growth they looked as well as any. This instance strengthens my theory that most of the failures of trees are due to the simple fact of the decay of young fibrous roots.

Planting such varieties as are better adapted to the soil, or grafting on stock less subject to being killed by wet, will greatly help to alleviate the trouble. The hardiest tree by far to plant in undrained soil, particularly where it is clayey, is the pear. And one of the best instances we recollect is at the University grounds, where, a number of years ago, a pear orchard was planted out beside one of cherry. Out of one hundred and twenty cherry trees seventy-five died the first year, and of the rest thinning out has continued until now but few remain. On the other hand the pear trees have grown well, and hardly any have died. Next in hardihood come the plums, and for apricots plum is the preferable on heavy soil. Of plum stock, the strong-growing varieties of Myrabolan have been tried, and at least for apricots, plums, and prunes must be considered a success, they having grown and produced well on it in a number of orchards.

The St. Julian has also been tried in the State. It will undoubtedly do as well.

For the peach, the Myrabolan as well as the St. Julian has been tried. The growth on these two, as I have seen them side by side in the Tosatti Nursery, at San Leandro, does not differ one from the other, and is only half of the peach on peach. Older trees growing on the Myrabolan stock, at Haywards, do not differ perceptibly from those on peach; however, I have seen none older than three years, but we have the statement of Mr. Rock, of San José, that he has trees on this stock in their fifth year doing well on soil where peach root will not succeed. He also states, that in grafting on this stock, a considerable number does not take.

Mr. Jas. O'Neil, of Haywards, in a circular, claims that the failure some people have had in making the peach trees grafted on Myrabolan grow, is due to their not being planted early enough. When planted late, the graft is in advance of the stock, and exhausts itself before the plum root has begun action. His remedy for this is to cut back the top of the peach very severely. This may be a remedy, but we can hardly accept the theory as correct, because, from what we know, the beginning of the growth is caused by the rise of the sap from the root.

The Olive in California.

A SHORT ACCOUNT OF ITS ADAPTATION TO MANY COUNTIES IN THE STATE.

SAN DIEGO.

The oldest olive trees in the State are undoubtedly found at the old Mission here. The trees at the latter place did, at one time, yield very handsome returns; but through neglect, and principally on account of the black scale, are not doing well.

Messrs. Frank and Warren Kimball, of National City, were amongst the first who planted olives on a large scale, and, although having to contend with the black scale, manage to make the trees profitable. All the trees in this section were this season loaded with fruit of fine size. The stock came from Mission, and shows some difference. The fruit was coming to maturity at the time of my visit (end of September).

Some irrigation is practiced by most people, the soil being naturally very dry; but with a little water the trees develop rapidly, bearing a little as early as four years.

No oil has been made for sale before this season; but the pickled olives of Messrs. Kimball have acquired a good reputation.

El Cajon Valley.—Mr. George Cowles has a number of very healthy looking trees, only four years in place, though several years old when planted. They are bearing some this year. They have not been irrigated. The black scale has not reached them yet. Major Levi Chase, at the upper end of the valley, has the largest olive trees in the valley, bearing for a number of years. The black scale is troubling the trees some, and has been treated with various washes to counteract its influence; and they presented a very fine appearance at the time of my visit, in September. The location of the orchard is on a gentle slope. The soil is a sandy loam. The trees have been irrigated very little.

LOS ANGELES.

There are about the City of Los Angeles many old trees, most of which are sadly neglected, and present a rather sorrowful appearance, chiefly owing to the black scale.

Pasadena.—South of the town of Pasadena, Mr. C. T. Hopkins has a large young olive orchard just coming into bearing, containing both Mission and Picholine; the latter were ripening at the time of my visit, end of September.

Pomona.—Having been unable to visit this section ourselves, and failing to obtain direct information upon inquiry, we can only speak from reports obtained second hand. According to these, the olive does exceedingly well and several large orchards exist, which have borne considerably in their fifth year.

SAN BERNARDINO.

The only olive trees in bearing in this county, which have come under my observation, are at Riverside. They are uniformly of a bright, clean appearance, although the black scale can be detected on them. Few persons have paid much attention to them, and I found it difficult to obtain any definite information as regards their bearing. In size and health the trees compare very favorably with any I have seen. No trees which I saw this year were very full, but I was informed that some years they had borne heavily. I am inclined to believe that it will not be feasible to cultivate the olive near the orange, as the latter requires vastly more water.

VENTURA.

About the old Mission are found some very large and old trees, which, by neglect, have become unproductive.

At the Camulos Ranch, I am informed by Mr. J. Del Valle that the olive does well, and has borne for a number of years, being troubled but very little by the black scale. Nearer the coast, as might be expected, the pest must be guarded against.

SANTA BARBARA.

The olive tree was planted about here by the early Mission Fathers, but not until Mr. Cooper commenced his plantings did the culture reach any importance. Since that gentleman has proved to the world the value of California oil, a number of persons have commenced planting olive orchards, several large orchards having been started in the Santa Inez Valley, where less moisture prevails, and where trees will probably suffer less from the black scale. Olive trees planted from cuttings will, according to Mr. Cooper, bear a little at four years of age, some trees giving two gallons of berries; at six years as high as thirty gallons from some trees; and at eight years good bearing trees will produce forty gallons each.

The soil on which Mr. Cooper's orchard stands is clayey, and in some instances a black adobe, on both of which the trees do well. The contour of the ground is undulating, thereby providing the necessary drainage. No irrigation is practiced. The black scale seems to be the only drawback to the culture.

In the Santa Inez Valley several large olive orchards have been planted, and according to the best information are doing exceedingly well.

SAN LUIS OBISPO.

Scattered trees can be found in the town of San Luis, being more or less infested with the black scale; otherwise the climate seems well adapted to its growth.

FRESNO.

The only olive trees we have had an opportunity to observe were on the grounds of the Fresno Vineyard Company, east of town. The trees are very young and healthy, free from scale, but not large in proportion to other varieties of trees. The trees were said to be in their fourth year, and had bloomed this season, but no fruit was set. It will probably not be found a good practice to plant olive trees between other trees, as the irrigation needful for the latter may prove too much for the olive, especially where seepage is as active as in many Fresno soils. When the matter of water can be regulated the olive ought to do well in this county.

SANTA CRUZ.

Around the ruins of the Santa Cruz Mission are still some remains of old olive trees, planted there many years ago. Neglect and the black scale have gone very hard with them. Still, they have produced abundance of fruit at various times. Other trees found in various places about town grow and bear fairly well, but all are troubled with the black scale.

In the mountains, farther back, the olive does well, growing rapidly, and when young, at least manage to grow well in the shallow soil found on the hills, among the redwood regions on the slope, toward Monterey Bay. In fact, young trees planted on my own place have developed more rapidly on the calcareous shady hills, than on the moister and richer soil. There is no question of the adaptability of much of the hills here to olive growing, but the black scale, if allowed to get foothold here, will be a most formidable enemy.

SANTA CLARA.

In the adjoining portion of Santa Clara County to Santa Cruz, known as Santa Cruz Mountains, a few trees of olives are growing. Of these, some belonging to Mr. W. H. Aiken, of Wrights, have come under my observation. The trees are now in their eighth year, and have borne for two years. The variety is the broad-leafed Mission, I think. No scale has troubled them yet. No irrigation is practiced. About Los Gatos, a number of olive trees are growing in different places. Both the Picholine and Mission are at Mr. C. Yoco's ranch, south of Los Gatos. The presence of black scale is plain, though it has not affected the trees very seriously so far. Some little irrigation has been practiced here, the rainfall being rather scant, the summers hot, and the soil of a dry, slaty nature. About five miles from Los Gatos, toward Santa Clara, lies the Quito Ranch, which contains the largest number of olive trees in bearing in the central part of the State, and one of the few where oil making has been inaugurated. The oldest trees on the place were planted twenty years ago, but the bulk of the bearing trees (some three thousand trees) are only eleven years old, half of which were transplanted, being too close together. The trees were set back severely, and have all succeeded, in two years commencing to bear a little. In 1884, the yield of about one thousand trees, which had not been removed or pruned severely, amounted to twenty-one tons of olives, part of which were made into pickles and part into oil.

Mr. Ludovico Gaddi, the manager of the orchard, claims to distinguish six varieties, all of which, however, have passed under the name of Mission. Their time of ripening generally falls in December. The black scale has been affecting the olive trees of the Quito Ranch for a number of years, but has been generally kept in check with whale-oil soap washes. In all, the Quito Ranch contains now eighty acres in olive trees, the youngest being four years old, these latter bearing a little this season. The soil is a gravelly loam, the ground level. No irrigation is practiced generally.

ALAMEDA.

Berkeley.—Besides a large number of varieties of olives gathered from different parts of the world and set out two years on the grounds, all of which are doing well, a couple of trees of the Mission variety have been in bearing for a number of years. The soil they are growing on is a deep, black, rather stiff loam, and the trees are much shaded by other trees. In consequence of this and the very cool summer climate, the fruit is late ripening, generally not fully ripe before the end of February. The trees bloom at the end of May. The yield at eight years old was about fifty pounds, at ten years over one hundred pounds per tree, while at twelve years each tree averaged two hundred and twenty-five pounds. The present year the crop has not been gathered, but, owing to the trees having been pruned and thinned out a great deal, it must be considerably less than two years ago. The ripening is, however, much earlier, many being fully ripe now. Every other year the yield has been extremely slight.

Niles.—On the place of H. E. Elsworth is found a row of different varieties of olives obtained from the old Mission of San José. The trees have been here for about four years, and were, when transplanted, four or five years old and of good size. Very little attention has been given to them, and the trees vary much in size. The largest tree is about fifteen feet high and is bearing well—has borne for several years. The soil is of heavy character. The fruit of the tree in question was ripe this season in the beginning of December.

Mission San José.—At the old Mission grounds, now the property of Mr. Juan Gallegos, a number of old large trees are growing, planted about one hundred years ago by the Mission Fathers. According to Mr. Gallegos, these trees were perfectly free from black scale until about nine years ago, when he thinks it was introduced with some orange trees. Before the advent of the scale these trees did exceedingly well. By severe measures, cutting back, etc., Mr. Gallegos has managed to bring them back to productiveness.

Here is also a good instance on record of the moving of large trees, as some trees twenty-two years old were moved with great success. The trees were taken up with a large ball early in the season, when the trees were but little active. The trees were in this case not cut back, and all did well. A watering was given to them immediately after planting. The season proved a dry one, still every tree lived; in fact, a transplanting the following season, which was quite wet, was not nearly so successful, many trees dying. This latter circumstance has led Mr. Gallegos to the custom of piling a mound around the transplanted trees, so as to shed the water. This precaution is to be recommended on all heavy soil. Large trees transplanted recover completely in two years. Besides these older trees, Mr. Gallegos has a number of young trees planted about his winery, and has introduced a number of different varieties. The soil is mostly of a decidedly heavy character, a black adobe in many instances.

Sunol.—Near the station of this name, M. J. Johnson planted, about four years ago, large numbers of olive trees, principally of the Picholine variety. The trees are doing well without irrigation, on comparatively dry, gravelly soil.

Livermore.—Mr. Charles H. Wetmore procured, five years ago, a number of large trees, five and six inches through, from the Mission San José. All did well in spite of being moved that distance, and have been bearing for two years. Young Picholines, planted four years ago as small rooted cuttings, have grown to quite a size, five and six feet high, and are bearing some fruit this year. The black scale affects the trees about the Mission San José, and was brought with the trees to Mr. Wetmore's place.

SONOMA.

Through Sonoma Valley can be found a number of olive trees scattered here and there. At the Rixford place there are a number of trees in bearing, the exact variety of which I have been unable to ascertain. The trees have been rather neglected, and show the effect of the black scale. The largest number of olive trees in this part of the State is found on the ranch of G. F. Hooper, on the road to Glen Ellen. The trees grow on a steep slope, and the soil is of rather heavy character. The trees are unusually vigorous, and are now in their tenth year, in full bearing, being well set with fruit at the time of my visit (end of June), promising to ripen early. The variety I took to be the broad-leafed Mission. Until the introduction of some orange trees from Los Angeles infested with black scale, the trees had been perfectly clean, but have gradually become infested from them, although not visibly except to the trained eye. As the climate here is quite dry, it is possible that the black scale will never become anything very serious, but its introduction should be well guarded against even here.

In the upper end of Russian River Valley, near Cloverdale, the Italian-Swiss colony have planted largely of imported olives, which, perhaps, will bear this season. We shall watch their fruiting with interest.

NAPA.

On the slopes near Napa City, and also in different parts farther up the valley, the olive is cultivated with success. Mr. Flammand has here a fine young orchard, which has been started from small cuttings, a method of which he is a great advocate. Mr. Flammand will shortly publish an account of his experiments which will be read with interest by a great many people.

SOLANO.

Throughout Vaca Valley some olive trees may be found, but the oldest trees are at the ranches of J. R. and Z. Wolfskill. The trees planted by J. R. Wolfskill about twenty-three years ago are thirty-five feet apart, and have been touching each other for some years. Many trees have a girth of over six feet and are, undoubtedly, the largest trees for their age in the State. The black scale has never troubled these trees, and the yield in good years is enormous. The fruit of these trees was formerly used for oil making by Mr. Yount, of Dixon, who had erected a little establishment of his own, but he discontinued the business several years ago; and the olives have been partly used for oil and partly for pickles made up at home. The oil has been exhibited at various fairs, and thought very favorably of. As a matter of interest to record is the fact that oil made in the fall of 1884 was found to be perfectly sound in the summer of 1886, although kept in an open vessel in a storeroom exposed to all the changes of temperature of season, day and night. The soil the olive trees here are growing on is a deep sandy loam on Putah Creek, considered very rich; no irrigation is practiced on the trees.

SACRAMENTO.

At the Capitol grounds are growing four trees planted about the year 1874. They are all more or less shaded by various evergreens, which are planted along the street and bordering the grounds. One of the trees especially, near the southwest corner of the grounds, is well loaded with fruit; the variety is a broad-leafed Mission. As near as I can learn, the trees have been bearing for four or five years, commencing, therefore, the first year after having been planted.

The fruit has been ripe this year at the end of November, but owing to the surrounding trees, ripens very unevenly.

The black scale is affecting the tree considerably, but besides, the tree is affected by another scale—*Aspidiotus nerii*, and identified as such by Prof. H. Comstock—which affect the fruit, causing it to look blotched, and interfering seriously with its development; and has been observed by me on olives from Yuba County, as well as in Placer County, and is evidently, unlike the black scale, able to live in the drier part of the State, and should be guarded against.

The trees on the Capitol grounds are necessarily irrigated, together with the other trees about them. The soil is a sandy alluvial.

Florin.—Mr. Isaac Lea, who exhibited a number of excellently pickled olives at the late Citrus Fair, furnished me with the following: "Some of my trees were planted sixteen years ago on shallow red soil. I have had trees this year bearing as much as fifteen gallons per tree. They are about twenty-five feet high. From layers I have had trees bearing at three years old; from cuttings it takes about five years. I have not been troubled with the black scale yet."

It will be observed that Florin is right on the plain, and subject to the dry winds much more than Sacramento City is.

LAKE.

The following has been reported by Mr. John Reimers, of Highland, Lake County:

"The only bearing olive that I have been able to learn about grows on the farm of Mr. Potter, on Kelsey Creek, which is one of the coldest parts of Lake County. Its precise age I have not been able to learn, but it is probably ten to twelve years old, and has been in bearing for some years. Its position is very unfavorable, being shaded by evergreens and different ornamental trees. It is about fifteen feet high and with a crown diameter of about ten feet. The soil is sandy (ash gray when dry), and considered very poor. The subsoil is clayey, yellowish red. The neighboring trees are watered sometimes, so that the olive probably receives benefit from it. It looks, in spite of its crowded and shaded position, very healthy and vigorous, and is free from scale insects and smut. Last year the tree was bearing but very little, but the year previous was loaded with fruit, as it was said to have been at various times before. The olives are said to ripen during October and November. Last year they were ripe in October. The variety is undoubtedly a Mission. My own few trees have done remarkably well, and from what I can see the olive seems to be well adapted to our climate. The lowest temperature it has reached during my residence is 17° F.; this year it did not go below 24°."

PLACER.

Penryn.—The oldest tree about Penryn is a tree growing on Orange Hill, the property of W. R. Strong & Co. The tree was planted six years ago, then probably five years old but very small, and although grown without care, having received no water except from seepage from neighboring trees, which have been irrigated, is a robust, healthy looking tree, about fifteen feet high, with a crown diameter of about ten feet and eight inches through at the trunk. The tree has borne for a number of years, and last season produced somewhere near one hundred and fifty pounds. This season it is bearing considerably. Scattered through the orchard are a number of olive trees of various sizes. The soil is a red colored, so called, rotten granite (Syenite). These trees are irrigated with the rest of the orchard and some few are in bearing, having been planted about five years.

P. W. Butler has a large number of olives, both of the Picholine and broad-leafed Mission, planted along avenues running through the place, which, like all the country, consists of rolling hills, with a similar soil as mentioned before. The trees were planted five years ago, then small rooted trees, having received liberal irrigation. They are about twelve to fifteen feet high, and commenced bearing last year. The Picholines are full of fruit this year and were ripe some time ago, many having dropped off; the Missions are not fully ripe now (middle of December). The fruit had not been utilized before this season.

Newcastle.—Mr. Charles Gould, below town, has three fine olive trees about ten years old, which have been bearing for a number of years; the trees are eight inches through at the base, with large crowns. The trees were loaded last season, but the crop is very light this year, though the fruit is of large size, evidently a Mission. Through the town of Newcastle is found an olive here and there. Dr. Frey has a tree in his yard doing well with the exception of the fruit being infested with the *Diaspinous* scale referred to before. Soil is similar to that about Penryn.

Auburn.—In this neighborhood are several good sized olive orchards, the oldest of these being that of Mr. L. A. Gould, some three miles from town. The majority of the trees are the so called Picholine, which evidently here are five weeks earlier than the Mission. The oldest trees are about seven years and are bearing quite full, one tree producing seventy pounds; their average height is about twelve feet, the habit very dense. Some oil was made from the Picholine this year, but was not clarified yet.

Beside the Mission varieties and these Mr. Gould has, are two other varieties of olives, one considerably smaller than the ordinary broad-leafed Mission, but of the same shape. Also a variety obtained from Mr. Rock, of San José, called Oblonga, of a peculiar almond like shape. Although a very small tree, it is loaded with fruit, ripening a couple of weeks before the Mission olive here.

Irrigation has been practiced to some extent by Mr. Gould. The soil is of slaty formation, and the trees seem to thrive equally well on the shallowest as on the deepest soil. No sign of the presence of black scale.

Mr. F. Closs, a mile or two from Auburn, has quite an orchard chiefly of Picholine; the soil is similar to that of Mr. Gould's, and the trees are doing well.

Dr. Agard: About twenty-five acres in all have been set out with olives by this gentleman, both of Mission and Picholine. The oldest trees were planted two years ago, rooted trees, and are about five feet high and are branched low, only with about one foot of a trunk. In spite of the little irrigation these trees have received (twice five gallons apiece during the first summer, and three times five gallons this summer) the growth has been uniformly good. Dr. Agard reports, however, a much greater loss of Mission trees than of Picholines.

EL DORADO.

The climate and soil of this county being very similar to Placer, we have no doubt that a great deal of land of the county is well adapted to the olive. We have learned of one gentleman undertaking the culture with success, without irrigation; but have not been able to ascertain anything definite about it. About Coloma there are several trees scattered, which have commenced to bear.

W. H. Hooper, on the road between Coloma and Uniontown, had a few trees planted, about five years ago, from cuttings. The trees are about six feet high; and one of them produced fruit this season. One of the trees has never been irrigated. All are bright looking, and clean from insects. The soil is of syenite formation, familiarly known as rotten granite, which allows the roots to penetrate. The first—a Mission—was ripe at the end of December.

YUBA.

About Marysville there have been planted a number of olive trees, and they are reported as doing well. We have not had any opportunity to judge for ourselves, but find that the various exhibits at the Citrus Fair show the presence of the diaspenous scale on the fruit, mentioned under Sacramento County; and it should evidently be guarded against, as it may prove a serious trouble.

Secretary's Report.

To the President and Members of the State Board of Horticulture:

Gentlemen: I now submit to you this my fourth annual report of the proceedings, management, and business of this Commission:

FINANCE.

The financial statement commences April 1, 1885, and closes November 1, 1886, and is for a period of one year and seven months. There was appropriated by Act of the Legislature, approved March 18, 1885, the sum of $10,000, for the year commencing April 1, 1885, and the same amount for the year commencing April 1, 1886.

For the year commencing April 1, 1885, there was expended the sum of $7,285 57. Claims for this amount, including the salary of Secretary and Inspector of Fruit Pests, were paid by warrants drawn by the Controller of State and paid to the several claimants by the Treasurer of the Board, General M. G. Vallejo; vouchers for all of which are now on file in my office. This left a balance unappropriated for the year commencing April 1, 1885, of $2,714 43.

The receipts and disbursements of the present fiscal year, from April 1, 1886, to November first, following, including the salaries of Secretary and Inspectors of Fruit Pests, amounts to $3,849 47; leaving an unexpended balance of the appropriation of $6,150 53. From this balance will be drawn the current expenses of the Commission, from November 1, 1886, to April 1, 1887, including the expenses of the Sixth Annual State Fruit Growers' Convention.

The foregoing statement agrees exactly with that contained in the report of our worthy and efficient Treasurer, General M. G. Vallejo, to which I refer you, as being a full and detailed statement of the financial transactions of his office.

INSPECTORS OF FRUIT PESTS.

The work of our Inspectors of Fruit Pests, both in the field and in making experimental tests of insecticides for the eradication of injurious insect pests, from which they have been enabled to issue bulletins of instruction to the fruit growers from time to time, as occasions required, as well as the necessary instruction in methods of application, time to apply, etc., have accomplished much good. Their reports, I am sure, will be read with interest.

The fruit interests of the State were never brighter than now, and this applies to all sections, with a steady advance that is unparalleled in any country. In a measure, we have solved, or have in course of solution, some hitherto serious and perplexing problems. Among these may be mentioned the old and threadbare subject of injurious insect pests, and the transportation and marketing of our fruits. With reference to the first of these subjects, it is happily the case that in the older and most important fruit localities—where many of these pests first made their appearance—they have been either totally eradicated, or are greatly diminished, and the alarm of a few years ago has disappeared. The transportation question, also, is fast approaching satisfactory rates and conditions. Within the last three years freight on green fruits to the eastern markets has been reduced gradually from $800, or more, per car, to the present price of $300 per car, by the train, and it is quite likely that the same strong *business* reasons that induced the transportation companies to make these reductions will continue, until our green fruits will be shipped East at a cost not to exceed $200 per car, on quick time and small trains. This, with our superior advantages, would place us beyond serious competition. It is unquestionably true that the high rates of transportation for the years 1880-1-2-3, and previous to that time, were the chief cause for the unusually large planting of fruit trees in the Southwestern States during those years, it being to them a plain and simple proposition that if they could realize on their fruits *one half* the price of the *freight* on green fruits from California they would make more than by cultivating any other crops.

But those fruit trees were planted, and are now producing fruits for market, and to the extent and quality of their production compete with our fruits in the eastern markets. It is therefore reasonable to conclude, that had the rates of transportation of our fruits for the years mentioned been even what they were the present year, we would have but little of this competition.

ACRES OF LAND PLANTED TO FRUIT TREES.

I present herewith the number of fruit trees as returned by the Assessors of the several counties to the State Board of Equalization. It was hoped that, as these reports were made by officers under oath, they would at least approximate correctness; but they are in many cases so glaringly at variance with the facts that the table of trees I present is of but little value. Upon this subject the State Board of Equalization make the following remarks:

> The Assessor of Contra Costa County has the distinguished honor of representing a county in which, so far as his report shows, not a single fruit tree is growing. Now, as regards Contra Costa, it is one of our best counties, and I have no doubt but that they have a greater number of growing fruit trees than has its neighboring county of Calaveras, whose Assessor reports one million one hundred and thirteen thousand four hundred and five trees. Alpine County is credited with seven hundred and sixteen; and Mono the *enormous* number of twenty. Santa Clara County is credited with having one million five hundred and sixty-nine thousand and sixty-four, the largest number of any county in the State, yet she has ever been a leading fruit county, planting trees every year; and in 1884 she increased her acreage eleven thousand acres in fruit trees, which if planted twenty

feet apart, and one hundred and eight to the acre, would be one million one hundred and eighty-eight thousand—so that an understatement must be apparent. But as a large proportion of the eleven thousand acres referred to were planted in prunes sixteen feet apart, the number of trees planted during the year 1884, in Santa Clara County alone, would largely exceed the whole number reported, to say nothing of the plantings of all the other years before and since that date. The whole number of trees reported in the State are but nine million eight hundred and eighty-two thousand nine hundred and ninety-nine, which, if planted twenty feet apart, would give but one hundred thousand acres. The State of Kansas, one of the very foremost in its progress in horticulture, in the report presented by its State Horticultural Society for the year 1885, shows they had planted in fruit trees nineteen million seven hundred and fifty-four thousand four hundred and nine, besides over twenty millions of forest trees under successful culture; while from the best information attainable, the State of Michigan, equally advanced in this respect, has not less than two hundred thousand acres of land planted to fruit trees. California certainly has more than any other State in this Union.

The importance of collecting correct statistics in this regard was realized by our legislators, and they wisely made it the duty of the Assessors of the several counties. But unless these statistics can be approximately correct they will be comparatively useless.

The following is the number of trees reported from the several counties for the year 1886:

Alameda	605,123	Sacramento	519,120
Alpine	716	San Benito	94,248
Amador	64,923	San Bernardino	1,018,837
Butte	115,888	San Diego	54,471
Calaveras	1,113,405	San Joaquin	59,342
Colusa	52,659	San Luis Obispo	94,340
Del Norte	6,936	San Mateo	14,650
El Dorado	241,736	Santa Barbara	18,237
Fresno	210,185	Santa Clara	1,569,064
Humboldt	39,965	Santa Cruz	171,050
Inyo	6,781	Shasta	51,845
Kern	54,905	Sierra	2,874
Lake	72,885	Siskiyou	56,900
Lassen	1,860	Solano	432,476
Los Angeles	983,510	Sonoma	614,411
Marin	34,303	Stanislaus	35,837
Mariposa	3,994	Sutter	126,760
Mendocino	37,560	Tehama	155,493
Merced	39,847	Trinity	12,252
Modoc	2,265	Tulare	238,419
Mono	20	Tuolumne	1,195
Monterey	10,450	Ventura	11,615
Napa	238,871	Yolo	107,535
Nevada	96,104	Yuba	77,535
Placer	298,120		
Plumas	11,482	Total	9,882,999

The following statistics and note were kindly furnished this office by the State Board of Equalization. Of course, they do not refer to wine grapes, that being shown in the report of the State Board of Viticulture:

Counties.	Number of Acres of Growing Grapevines.							
	For Table.				For Raisins.			
	1 Year.	2 Year.	3 Year.	4 Year and Over.	1 Year.	2 Year.	3 Year.	4 Year and Over.
Alameda	10	10	25	50	30	43		
Amador	50	40		115				15
Butte			3	338	12	50	21	144
Calaveras	20	240	290	330				30
Colusa	34	10	14	5				
Contra Costa	1,000	2,200	1,000	250				
El Dorado	12	5	2	21			2	41
Fresno	71	146	81	128	620	416	429	548
Lake	10	15	10	22				
Los Angeles		300	1,500	900	200	400	300	400
Mendocino		10	15					
Merced	7	64	46	170	7	3		10
Napa	5	189	144	96				
Nevada	6	5	4	90	1		7	8
Placer	122	116	116	274	15	32	45	268
Sacramento	131	340	225	608		126	3	198
San Bernardino					385	112	175	1,023
San Diego	42	34	54	51	557	540	260	166
San Joaquin	100	110	35	273				
San Luis Obispo	152	140	75	77				
Santa Clara	740	283	450	465	56	25	15	43
Santa Cruz	75	52	285	115				
Shasta	10	8		40	33	19		12
Solano	377	244	103	231	30	53	11	494
Sonoma	50	400		1,450				
Stanislaus	3	10		20				
Sutter	5	10		44	53	11		7
Tehama	144	146	30	25	150	10	14	
Ventura				30				
Yolo		70	60	25	10	100	200	500
Yuba	3	3		10				
Totals	3,179	5,200	4,567	6,253	2,159	1,940	1,482	3,907

Total number of acres: Table, 19,199; raisins, 9,488;—28,687.

Note.—Agricultural and viticultural statistics will, under the present system of obtaining them, always be untrustworthy. For instance, Placer County is assessed in districts. The Assessor of District No. 2 reports two hundred boxes of raisins, while in District No. 1, where, within two miles of Rocklin, the California Raisin Company cultivate nearly two hundred acres of raisin grapes, the Assessor reports, as to the number of boxes of raisins in his district, "impossible to ascertain." The Assessor of Marin reports one hundred and seven thousand *acres* of vines, which is, of course, untrue. He possibly means vines. The table is presented, however, as approximately correct.

SHIPMENTS OF FRUIT BY RAILROAD.

Through the politeness of the Southern Pacific Railroad Company, I read the following memorandum, from which it appears that forty-eight million nine hundred and twenty-four thousand three hundred and ninety pounds of fruit was shipped over their road to eastern points, for the year 1886, viz.:

Of green fruit, citrus	26,887,570
Of green fruit, deciduous	22,036,820

DRIED FRUITS AND NUTS.

Review of the Dried Fruits and Nut Crops of 1886.

The following statistics and remarks relating to the dried fruit, raisin, prune, almond, and walnut crops of California for the year 1886, are from the annual circular of George W. Meade & Co., of San Francisco:

The Product of 1886.

	Pounds.
Honey, extracted	6,000,000
Honey, comb	800,000
Beeswax	80,000
French prunes	2,000,000
German prunes	125,000
Apples, sun-dried	300,000
Peaches	750,000
Plums	500,000
Pears	50,000
Grapes	175,000
Apricots	150,000
Nectarines, sun-dried	30,000
Figs, sun-dried	150,000
Apples, evaporated	500,000
Apricots, evaporated and sun-dried (bleached)	450,000
Peaches, evaporated (peeled)	100,000
Peaches, evaporated (unpeeled)	200,000
Plums, evaporated	85,000
Nectarines, evaporated	25,000
Walnuts	750,000
Almonds	600,000
Raisins, 20-pound boxes	703,000

We estimate the total raisin product of 1886 at 703,000 boxes, and apportioned as follows:

Fresno District, boxes	225,000
Tulare District, boxes	8,000
Riverside District, boxes	185,000
Orange and Santa Ana District, boxes	160,000
San Diego District, boxes	25,000
San Bernardino County, boxes (outside of Riverside District)	10,000
Yolo and Solano, boxes	75,000
Scattering—Yuba, Butte, Sacramento, etc., boxes	15,000
Total, boxes	703,000

It is with a great degree of satisfaction that we approach the subject of California raisins for the year of 1886. For many seasons past it has been simply up-hill work to introduce our raisins and to convince the eastern trade generally that California could produce a fruit equal to the Malaga. While the failure to do this in a measure was perhaps due to the fact that many of the packings of California raisins were of poor quality, it is, nevertheless, also true that a prejudice existed in the minds of the eastern jobbers to that extent that they persistently set their faces against a California raisin. Notwithstanding, however, these discouragements, Californians have kept steadily at work improving the product as well as the style of packing, year by year, until the outturn of 1886 on many brands, at least equals if it does not exceed in quality the very best Spanish fruit.

The labor of Spain for raisin packing is very cheap, running from 15 to 30 cents per day, while in California the same work is paid from $1 to $1 25 per day. To counteract this great discrepancy, therefore, it has become incumbent upon the ingenuity of Californians to devise and create machinery which would not only quicken the packing of raisins, but would at the same time reduce the cost. The result of this is that in California machinery is about being used and run by steam power for stemming, grading, facing, and packing in the boxes of the fruit as it is received from the grader.

IMPROVEMENT IN PACKING.

All over the State this year there has been a great improvement in packing, and many of the best brands produced here rank equal or superior in every way to the Malaga fruit. A proof of this is the fact that such markets as New York, Boston, Philadelphia, and other large eastern cities, have taken the finest brands of California raisins, at prices equal or even above the Spanish goods. Different sections of the State naturally claim the best raisins; but very much depends on the care taken in packing, sweating, and properly preparing them for market. Nearly all the various raisin sections of California can produce, and do produce, excellent raisins; and there are as yet many undeveloped sections, which can produce raisins equal to any yet turned out. As a general proposition, it will pay all producers of raisins to sell their fruit in sweat-boxes to some regular and reliable packer, who will maintain standard grades, from their own section of the country. The policy now in vogue, to some extent, of small producers from every raisin section packing on their own account, only produces irregular and uneven grades, and is not calculated to lead to any permanent benefit to the California raisin industry. Producers should not be packers or speculators, as it will fail them, in net results, nineteen times out of twenty. The best way is to sell their raisins in sweat-boxes, as before stated, to regular packers. We can repeat our suggestions of last year—that some different branding should be used for California raisins. As it is now, we are simply imitating the Spanish brands; but, in our opinion, something distinctly Californian should be used.

The trade for California raisins, of good brands, throughout the United States, has never been as good as this year, and at fair prices. They have been introduced into markets where they have never before been known; and it is now only a question of time when, with care in packing and grading, we will entirely drive the imported raisins from America.

CALIFORNIA FRENCH PRUNES.

We place the total output this year at two million pounds. The low prices ruling last year for the California French prunes so stimulated the demand in the eastern markets for this really choice fruit that the entire product of this year has principally been marketed, and at higher figures generally than last season.

In this there should be no surprise, as the California French prune is a different article from the imported French prune. Our prunes, as every consumer knows, are more like dates, and when cooked are of a most delicious flavor. Besides this, dealers have found out that the California prune keeps better and longer without sugaring than the imported goods. For many years our suggestion, repeated season by season, to grade our prunes, has been finally adopted; and the bulk of the California prunes this year have been graded according to size, as nearly as possible.

Next year we anticipate that improved machinery will be adopted, which will grade the prunes as close as the French goods.

Prices this year have ruled all the way from 6 cents to 10 cents per pound, according to grades. The bulk, however, of the fruit has run in size from seventy to one hundred and ten, or thereabouts, the proportion of the larger fruit being very light.

The prune industry of California is one that is constantly increasing, and which promises great development. We have the United States for a market, and it is not possible to overdo such a market as that for a very long time to come. Our best prunes, so far, come from the Santa Clara Valley, though other sections, like Sacramento and Sonoma Counties, are turning out some very nice fruit.

The output of California German prunes is as yet comparatively small, as the French prunes raised in California are so much superior that there has been little call as yet for the German prunes. There is, however, any quantity of land suitable for the growing of this fruit profitably. With a large number of our German people these prunes are preferred, as they have more of the taste of the Fatherland.

A number of new orchards are coming into bearing, and we expect a large increase in this product year by year, though of course they will never equal the quality of our French prunes.

APPLES, SUN-DRIED.

As will be noticed by our report, the supply this year has been heavily decreased. This is accounted for by the fact of the extremely low prices that ruled last year—far below the cost of production—which has discouraged producers from entering the business again this season.

In addition to this, we may mention that we think the day of sun-dried apples is rapidly passing by, and that this fruit is being supplanted everywhere by the machine or evaporated apples, which are very handsome in appearance, more cleanly, bring better returns to the producers, and which are being taken pretty generally by the whole retail trade of the country in preference to the sun-dried. We are very glad to note this fact, as a choice evaporated apple, besides being in every way better, is also more economical to the general consumer than the sun-dried fruit.

SUN-DRIED PEACHES.

We report quite a large falling off from last year in the production of this fruit, also. This is easily explained from the fact that the crop itself was light, and was very largely bought up in a fresh state early in the season by our large canning establishments, and also largely shipped east in car lots in a fresh state, for sale in eastern markets. Fancy prices were obtained by our growers this year for this fruit in the green state, and naturally the quantity that was dried was cut short very seriously. The net results to shippers East of the green fruit has been, we understand, in many instances quite unsatisfactory, and the chances are that another year the product of California peaches will be again increased.

The dried peaches from this side are in favor all over the United States, being superior to anything produced elsewhere.

There is no possible chance of overdoing the eastern demand, as new markets are being constantly opened up year by year, and at prices remunerative to our growers. The planting of peach trees is still going on in different portions of the State, and the growers can depend upon it, that they will never have to search very far for a market for all they can produce.

SUN-DRIED PITTED PLUMS.

The same remarks as to peaches will apply to plums. Growers of this fruit became very much discouraged last year, and this season, instead of drying, many sold their fruit at a low price to the canners, or let it rot on the ground. The result is a decline in the product as compared with 1885. In consequence of this, prices have been much better, and all good plums are now bringing figures that pay the grower well, and we look for a heavy output next year if nothing happens to the growing crop.

Like our California peaches, our plums are in equal favor in the East, being the finest plums seen anywhere. There will always be a good demand at fair prices for any quantity of plums that California can produce, and it is only necessary to take care in proper curing, drying, and the way in which they are put up for market.

SUN-DRIED PEARS.

Only a small quantity of this fruit was dried this year, owing to the lack of the green article. The demand, however, from different markets has also ruled very small, so that shortage in supplies was not particularly felt. We note, with pears, that the demand, like apples, is running on the evaporated instead of the sun-dried, and we think it altogether probable next year that sun-dried pears will be almost entirely done away with, and that everything will be evaporated.

SUN-DRIED GRAPES.

The prices offered by the wine men this year for grapes has caused a great many to be crushed into wine that have been heretofore dried. In the dried state the Mission grapes of California can be used for a cheap cooking raisin at a fair price, and large quantities of them can be sold.

SUN-DRIED NECTARINES.

This fruit is one of the finest in California, but as yet the production has not amounted to very much; for what reason we are hardly able to state, as we know of no better fruit than the nectarine. The trade, however, has not been educated up to them as yet. For this reason the demand continues to run light. We believe that the time will come when the nectarine will rank equal in demand with the apricot or with the peach. In certain sections of California they are produced abundantly, and there is no reason why they should not meet with a heavy demand where they are introduced.

SUN-DRIED CALIFORNIA FIGS.

We note a considerable increase in the product this year, and which is of better quality and of better packing. Wherever these figs are thoroughly introduced we always notice an increase of orders. Outside of the fact of their being of a purple color they are equal in flavor to the imported figs. Nothing is against them but the color, but, as before stated, they are gradually winning their way in different parts of the country, and we look to see the time when a California purple fig will take its place in the great markets of the country the same as the Smyrna fig of to-day.

It is a tree that, planted in certain sections of California, produces abundantly, and even at the low prices now ruling pays the grower about as well as any other fruit that we know of, as scarcely any care is needed, and the fruit is generally allowed to ripen on the tree and drop off. Then it is picked up, packed into boxes or sacks, and shipped to market. All the expenses that are attendant upon the preparation of other dried fruits are not required with the fig. We believe that California in time will be dotted with fig orchards. We are also producing here, but in very small quantities as yet, the California white figs, from imported stock. This fig, samples of which we have seen, is equal or superior to the best goods from Turkey.

SUN-DRIED APRICOTS.

Owing to the very heavy demand in the fresh state for this fruit on eastern account for the past year, like peaches the product was very seriously curtailed, and there has been a corresponding advance in price. There is always a good trade for our sun-dried apricots at fair prices, and really there is no limit to the demand unless prices are advanced so high that dealers turn to cheaper fruits. We can repeat our recommendation of last year, that all sun-dried apricots should be bleached, as they bring a good deal more money and are much nicer in appearance, sell more rapidly, and in every way are preferred by the jobbing trade, and it is simply impossible to get enough of sun-dried bleached apricots for the demand.

EVAPORATED APPLES.

The output this year of this fruit shows some decline from last year, owing to a short crop of the green fruit. In quality, however, we note a very great improvement, both in the fruit itself and in the style of packing, as well as in the bleaching and in the careful selection of the goods before packing in boxes. All of this is necessary to fully establish a demand for California evaporated apples.

In the Eastern States the very greatest care is taken in putting up evaporated apples, and all pieces containing cores and skins, or those that are not properly bleached, are rejected and sold as second grade of fruit. For many years everything in California was packed up indiscriminately, with a result that dealers generally found great fault, and justly so, with the evaporated apples from this side. With the extra care and improvements now made all this is being done away with, and our evaporated apples are taking their places in the various large western markets, at an equal price with the eastern fruit. There remain, however, some improvements yet to be made in the paper that is used, and in facing and packing generally. We would suggest the "fringed paper" that is used by the large eastern packers, as this adds to their appearance and not very much to the cost.

In the facing of the fruit the best pieces should be picked out, although the fruit through the body of the box should run uniform and be as near like the facing as possible. As we have before mentioned, the sale for the sun-dried fruit is yearly decreasing, and there is consequently a great future for our evaporated apples.

The demand is such that the supply that we can produce will never be sufficient to overstock the market, and will always be taken at remunerative prices.

EVAPORATED APRICOTS.

The quantity of this fruit prepared for the past season has been a little less than in 1885. The reason for this is the same as for sun-dried apricots, viz.: the purchase of large quantities of the fruit in a fresh state for shipment East and for canning purposes. The quality of the product, however, turned out has been excellent, and has been met with appreciation. The active demand in the various eastern markets, and at largely advanced prices over last year, shows that the fruit is well liked, and the more it is distributed among consumers of the East the more it is liked.

While the figures ruling this year have been rather high, at any reasonable price it would still be a paying one to the producer, and there is hardly a limit to the demand for these goods.

EVAPORATED PEELED PEACHES.

Owing to the short supply of the green stock on which to work, only a very small quantity, comparatively speaking, were put up this year, all of which have been placed both here and East at fancy prices. It is likely next year that the product of these goods will be largely increased.

The quality excels anything produced in America, and they are so well liked wherever known East that they realize higher prices than the best Delaware stock.

We of course refer to our choice stock only, and such as is properly prepared and packed for market.

EVAPORATED UNPEELED PEACHES.

The output of this crop this year has been also quite light, for the same reasons as named on peaches generally. The demand, however, for our unpeeled evaporated peaches has never been very large, and we advise a more general peeling of this fruit. When parties desire an unpeeled peach, if they can get a good sun-dried unpeeled at a less price, they are more apt to take it than an evaporated unpeeled peach at higher figures.

There is, of course, always more or less trade for these goods, but never in a very large way.

EVAPORATED PLUMS.

Our remarks on sun-dried plums will also apply to the evaporated stock. Prices for plums generally have been so very low for the last year or two that growers have largely curtailed their operations. There is not a finer fruit anywhere than the evaporated plum, and we believe that it is gradually winning its way in the different markets of the country. Of course the sale will never be as large as for the regular cheaper sun-dried plums in sacks, but there is, nevertheless, a trade who want a fancy plum, and these people will always call for the evaporated.

EVAPORATED NECTARINES.

The product of this choice fruit is increasing year by year, and as it is being better known, it is very widely appreciated. It is one of the finest of California fruits, although it has never been pushed to the front like many other fruits produced in this State; nevertheless, for table use there is no finer fruit than our evaporated nectarine.

CALIFORNIA WALNUTS.

The crop this year is hardly as large as last season, but the stock is of superior quality, and the bulk has been principally placed here and in the East at higher figures.

We are very glad to see, finally, that the California walnut is taking its proper place and realizing a fair price in the largest markets of the United States. There is not now, and never has been, any reason why the walnuts of this State should have been selling at from 9 to 10 cents per pound, while the imported walnut, no better, was bringing in New York 14 to 15 cents per pound.

Eastern dealers have finally discovered this fact, and the result is that the entire crop of the best walnuts of this State this year have been placed East at prices almost equal to the best imported walnuts.

This is an industry that permits of great development. We have the entire United States for a market. There are many sections of California which can produce successfully fine walnuts, and no fear need be had that the market will be overdone.

CALIFORNIA ALMONDS.

This was our off year in almonds, and consequently we report a decrease in the output, but the growing of almond trees in California is certainly on the increase, so in the course of a few years the annual product will increase continually.

The quality of the almonds this year, like the walnuts, has been exceptionally fine, and, owing to a short crop, have been in very active demand, at increasing prices, for eastern shipment.

The same remarks that we have made on walnuts will apply to the California almond. They have been, year by year, tabooed by eastern jobbers, although intrinsically worth as much as the imported. This having finally been admitted, there is now no trouble whatever in selling California almonds in any eastern market, and at prices that approximate the best imported. The sections that can be devoted to the growing of California almonds of this State are very many, and a number of new orchards are yearly coming into bearing. Take this product one year with another and it pays a very nice return to the grower, and we believe the time will come when California walnuts and almonds, like California raisins, will drive the imported goods from the American markets forever.

At your meeting in April, 1886, your honorable body appointed a number of quarantine guardians for the different fruit sections; and, as provided by law, during the recess of the Board the Inspectors of Fruit Pests, to a considerable extent, have also exercised that authority, and have appointed many others. I am glad to state that, with few exceptions, these quarantine guardians have been of incalculable benefit to the State, as most valuable aids to the Inspectors in their important work; but, except in a few counties where the Board of Supervisors made reasonable appropriations for their compensation, their pay for their services has been entirely inadequate, to say nothing of the unsatisfactory manner in which the law requires they shall be paid. It provides as follows: "The salary of quarantine guardian shall not exceed two dollars per day, and shall be paid by the owners of orchards, and other places and localities under quarantine regulations." This difficulty has prevented many useful and intelligent horticulturists from accepting these important offices, and consequently, in many cases, the enforcement of the law. The only way, apparently, to obviate these difficulties, and at the same time take effectual measures against the ravages of insects, under existing laws, was pursued by the Counties of San Diego, Los Angeles, and other counties, where the Board of Supervisors appointed a Board of County Horticultural Commissioners, and divided the county into quarantine districts. These Commissioners, acting under the law of March 4, 1881, then appointed local

Inspectors for the several districts, whereupon the State Board of Horticulture (or the Inspector of Fruit Pests) also appointed the same persons to the office of quarantine guardians. The Board of Supervisors, having provided a reasonable compensation for the officers mentioned, there was but little objection or resistance to their authority. It is believed that in most cases the best appointments were made in the selection of these officers; but if not, the fault is with the people themselves, for in all cases they have been requested to assemble together and select the most competent and satisfactory men and recommend them to this Board for appointment, and in all cases these requests have been complied with.

The following persons, for the several counties named, have been appointed to the office of quarantine guardians:

For San Diego County — R. D. Perry, J. L. Griffin, S. G. Antis, H. McKennon, J. M. Gonzalez, F. H. Heald, Chester Gunn, J. E. Gedney, G. W. Parnell, M. C. Woodson, John G. Sloan, W. P. Fowler, D. R. Foss.

The Horticultural Commissioners of said county are the following, to wit: O. N. Sanford, President; J. L. Griffin and G. W. Parnell, Secretaries.

Shasta County—H. K. Petigrave, Nicias Watson.

Modoc County—John Deedson.

Contra Costa County—Harvy M. Waterbury, W. B. Holliday, James McNulty.

Santa Clara County—A. L. Bascom.

Sacramento County—Dwight Hollister.

Napa County—J. W. Mansfield, J. C. Weibright.

Ventura County—E. P. Foster, N. W. Blanchard.

Sonoma County—S. McKinley, W. Chapman.

Butte County—John H. Guill.

Alameda County—A. T. Perkins, Clinton King, H. G. Elsworth.

Placer County—George D. Kellogg.

San Joaquin County—W. H. Robinson.

Fresno County—Dr. G. Eisen, Richard Wheeler.

San Bernardino County—Wellwood Murray, Elsmond Chaffee, L. M. Holt.

Marin County—John R. Sweetzer.

Los Angeles County—George D. Whitcomb, James Lang, Benjamin Wright, W. R. Barham, J. R. Dobbins, S. McKinley, J. D. Carr, R. T. Mullard, Dr. N. Lindenfeldt, W. G. McMullin, Alfred Wright, General J. H. Shields, Dr. O. H. Conger, Edmond Gray, Herbert S. Daniels, G. Cowen, A. J. Wood, Robert J. Northam, George Rice, A. D. Bishop, J. H. Burk.

The legal difficulties referred to as affecting quarantine guardians will, no doubt, be remedied by the forthcoming Legislature, and such other needful legislation as experience under operation of the present Board of Horticulture has shown to be necessary. Laws, however, sufficiently stringent should be passed to effectually prevent the careless and indifferent owners of a few fruit trees infested with noxious and injurious insects from being spread and disseminated in orchards of honest and useful fruit growers who have invested their means in this, one of the first industries of our State, and are doing all they can, and with heavy expenditures of money, to eradicate these pests. With reference to proper Congressional legislation affecting the interests of pomology and all branches of agriculture, it may be proper to state that at the State Fruit Growers' Convention, held in Los Angeles, in November, 1885, resolutions were passed requesting our Representatives and instructing our Senators in Congress to procure certain legislation relating to certain pomological interests mentioned, and also to *oppose* the then threatened Mexican and all other Spanish-American, so called, reciprocal treaties. Your Secretary was instructed to have the same printed and forwarded to our delegation in the Senate and House of Representatives. This was done, and copies sent to each of them, but I regret to say that up to the present time not one of these distinguished gentlemen has *even acknowledged their receipt*, much less making an effort to comply with the request.

The law makes it the duty of the Secretary to collect books, pamphlets, periodicals, and other documents containing valuable information relating to horticulture. I am pleased to state that I have purchased, and now have in the office of the State Board of Horticulture, in books and pamphlets on the subject of pomology, horticulture, and kindred subjects, one hundred and sixty-seven volumes, costing $755 26. The object of the Board has been to collect the most reliable standard works on these subjects. No pains or reasonable expense has been spared in this investment, and the result is that the Board library, to the extent of the books purchased, will compare very favorably with any in this country. Many of the Boards, Societies of Horticulture, and Experiment Stations of our sister States, through their proper officers, have kindly exchanged their reports with this office, and this has been done also by a number of foreign countries, thus greatly enhancing the value of our library. It affords the fruit growers of our State, especially from the interior, when they visit the office, infinite pleasure to while away a portion of their leisure moments in the perusal of these rare works, and it is earnestly hoped by the Board that all fruit growers when visiting San Francisco, may visit the office.

The correspondence of this office has constantly increased, until now it has become desirable, if not too much expense, to have an assistant—a boy, for instance—at $25 or $30 per month, to be appointed by the Secretary.

GROWTH OF HORTICULTURE IN OTHER STATES.

While our advance and development in horticulture has been great, nearly all other sections of the country have seemingly caught the spirit of progress, and some of the older States that have hitherto neglected it so far as appropriating money for its support and legislation to advance it, have of late years come to realize its importance, as is shown by the very able and valuable reports of their horticultural Boards and societies. The following, on the subject of financial aid, is from an address by General N. P. Chipman, delivered before the State Agricultural Society, at Sacramento, September 16, 1886, which shows a wide contrast between some European countries and our own in extending financial aid to agriculture. For instance, he says that " France appropriates $20,000,000 to foster agriculture; Brazil, $12,000,000; Russia, $11,000,000; Austria, $5,500,000. All the great powers provide liberal government aid. The United States gives about a half million dollars. We want a Department of Agriculture and Labor, with a Secretary at its head, who shall rank in our councils with the other Cabinet Ministers. Think of the millions spent to support the War Department in times of peace, and the insignificance of its usefulness when compared with an intelligent expenditure of liberal appropriations in the encouragement and development of rational tillage of the soil." Again, Massachusetts should be mentioned for having, as far back as 1820, established a horticultural society, which has the largest and most valuable library in the United States. Her reports are of vast importance to those interested. Michigan, Kansas, Missouri, Illinois, Ohio, Indiana, and other States, have published horticultural reports that reflect credit on their respective States. Even young Minnesota, where they never can hope to produce any except the hardier fruits, issues a report of over four hundred pages. The discussions in their convention show conclusively that if success is possible, they have the men, at least, to accomplish it.

APPENDIX.

Proceedings of the Seventh State Fruit Growers' Convention; Fruit Crops of California for the Past Six Years; California Dried Fruits; Number of Trees Growing in the State in 1886; Olive Growing; Orange Growing; How to Pick and Pack Citrus Fruits; Tree Planting; Citrus Culture; Proceedings of the Board and of Executive Committee; Library of State Board of Horticulture.

REPORT OF SEMI-ANNUAL FRUIT GROWERS' CONVENTION.

Held at Riverside, San Bernardino County, California, under the auspices of the State Board of Horticulture.

The Seventh Fruit Growers' Convention, held under the auspices of the State Board of Horticulture, convened at Riverside, San Bernardino County, California, Monday, April 11, 1887, a full representation of the Board being present, viz.: Hon. Ellwood Cooper, of Santa Barbara; A. Block, of Santa Clara; Dr. E. Kimball, of Haywards; Gen. M. G. Vallejo, of Sonoma; A. S. Chapman, of San Gabriel; N. R. Peck, of Penryn.

Remarks by **Hon. Ellwood Cooper**, President: This will be the seventh State Fruit Growers' Convention, and the third held under the auspices of the State Board of Horticulture. At the convention held at Sacramento from November fifteenth to twentieth of last year, it was by unanimous consent determined to hold these conventions bi-yearly, one in the spring and one in the fall. It was also then and there determined that the next should be held in April, and in Southern California, Los Angeles being the center, the State Board clothing me, as President, with the authority to fix the time and place. It was understood, however, that it was to be in Los Angeles. Certain representations were made to me as coming from extensive fruit growers of Los Angeles, that it would be better to hold this convention either in San Diego, Santa Barbara, or Riverside. After a careful review of the whole situation, it was thought that we could have the most satisfactory meeting in Riverside, and possibly get the best results by so doing. I was also authorized by the different members of the Board to so determine. I will state in this place, that the transactions of the two previous conventions, the one held in Los Angeles in November, 1885, and the one held in Sacramento, November, 1886, will appear in the biennial report of the State Board of Horticulture. Ten thousand copies have been ordered, so that we hope the valuable information imparted by these reports will be accessible to every fruit grower in the State. These discussions, with the essays and different reports, have not been equaled by any previous publications. We recommend the same for your most careful examination. The books were promised to be ready for this convention. Owing to a deficiency occurring in the appropriation for the State Printing Department, the work has been delayed. An amended bill, dividing the State into two districts, with a Fruit Inspector for each district, with an increased appropriation to defray the expense, failed to pass. Also, a bill to prevent the spread of insect pests failed, so that we are left in the same position as heretofore.

Regarding the progress made, as to the remedies for the destruction of insect pests, it is not encouraging, and I can only repeat from my address at the convention held at Sacramento: "In the southern counties, where the greatest alarm exists as to the ravages of the *Icerya purchasi*, no certain method or remedy has been adopted; it is still an experiment and an undetermined problem. As to the black scale on the olive, nothing certain has been developed at a moderate cost. The codlin moth is extending its ravages; large apple growers are more or less discouraged; new insects and blights have appeared. We are here to meet these difficulties. The two great questions which will solve the problem of successful fruit growing, are—first, insect pests; second, coöperative fruit unions. Our market is East. Carload lots and special fruit train shipments are a necessity. There being no home market, without coöperation the small grower has no status, neither have communities. I also call your attention to the great influx of people seeking new homes and better climate. The ultimate object of the great majority is fruit growing. It behooves us to give them such information as will prevent them from sacrificing their money in fruitless endeavors. It is our bounden duty to save them from bankruptcy in this business by furnishing them with reliable information on every point with which we are familiar."

Since my arrival in Riverside it has been suggested to me that we take some action with regard to the interstate commerce bill, that is, so far as it may affect rates of freight to eastern markets. If the convention deems it advisable, I would recommend that the State Board be instructed by resolution what action to take in that regard.

We have present with us the most distinguished entomologist in the country, Professor C. V. Riley, President of the United States Government Entomological Commission. I have learned from him that he can only be with us to-morrow, as his time is limited. I regard his presence at this time as very opportune. Insect pests, the subject for discussion as arranged on our printed programme, will come up in the morning of to-morrow, when Professor Riley will address us. His familiarity with insect pests and insect life will enable him to give us much valuable information.

In order to give those who would come on the twelve o'clock train an opportunity to be present at the opening, the convention adjourned until two o'clock P. M.

AFTERNOON SESSION.

President in the chair. The first business was the appointment of two additional Vice-Presidents. L. M. Holt and S. C. Evans, of Riverside, were selected to fill these positions.

Mr. B. M. Lelong, of Los Angeles, was invited to assist the Secretary.

E. W. Holmes, H. J. Rudisill, and I. N. Wilcox were selected as additional members of the Committee on Programme.

The Chairman then introduced **MR. H. J. RUDISILL**, who delivered the following address of welcome:

Gentlemen of the State Board of Horticulture, members of the Fruit Growers' Convention and friends of horticulture: You meet here to-day for consultation and for friendly interchange of experience in matters connected with one of the most ennobling and delightful arts to which human thought and labor can be devoted.

The earlier life of the people of the Pacific Coast, especially under the auspices of the American Government, was not favorable to horticultural development. It is only within a comparatively recent period that local horticultural societies have been established, or that the State has considered the coördinate branch of agriculture as one of sufficient importance to require a State Board of Horticulture, to whom we may look for guidance, advice, and assistance.

This delay in recognizing the value of such organizations was, no doubt, due further to the influence of that peculiar feature graphically named over forty years ago as the "spirit of unrest," which has always been recognized as an enemy of horticultural development. While this grand energetic element leads us to clear the vast forests, build transcontinental lines of railroad, and settle new States with a rapidity unparalleled in the history of the world, on the other hand, when followed into the bosom of society, makes man a feverish being in whose Tantalus cup *repose* is the unattainable drop. Unable to take root anywhere, he leads socially and physically, the uncertain life of a tree transplanted from place to place and shifted to a different soil every season.

It has been shrewdly said that what qualities we do not possess are always in our mouths. Our countrymen are fonder of no one Anglo-Saxon word than the term *settle*.

It was the great object of our forefathers to find a proper place to *settle*. Every year large numbers of our population from the older States go west to *settle*; while those already west *pull up* with a kind of desperate joy their yet new set stakes and go farther west *to settle* again.

Yet as a people we are never settled. It is one of the first points that strikes a citizen of the old world where something of the dignity of repose as well as the value of action enters into their ideal life. De Tocqueville says, in speaking of this national trait: "At first sight there is something surprising in this strange unrest of so many happy men—restless in the midst of abundance. The spectacle, however, is as old as the world. The novelty is to see *a whole people* furnish an exemplification of it."

In the United States a man builds a house to spend his latter years in, and sells it before the roof is on; he brings a field into tillage, and leaves other men to gather the crop; he embraces a profession, and gives it up; he settles in a place which he soon after leaves in order to carry his changeable longings elsewhere. If his private affairs leave him any leisure, he instantly plunges into a vortex of politics; and if at the end of a year of unremitting labor he finds he has a few days' vacation, his eager curiosity whirls him over the vast extent of the United States, and he will travel fifteen hundred miles in a few days to shake off his happiness.

The condition of the western emigrant is, simply, that the long, covered wagon, which is the Noah's ark of his preservation, is also the concrete essence of *house* and *home* to him. He emigrates, *he squats, he locates;* but before he can be fairly said to have a fixed home, the "spirit of unrest" besets him. He sells out *his diggins* to some less adventurous person, and, tackling the wagon of the wilderness, migrates once more. In California this temperament receives a new impetus in the stimulating climate and the glittering prospects offered in the numberless opportunities for making money rapidly. It still, unfortunately, exists in our midst, and its effects are in the speculation that is spreading with remarkable rapidity from the Mexican boundary even to the glaciers of Mount Shasta.

It is, therefore, not difficult to see how strongly horticulture antagonizes this spirit, and contributes to the development of local attachments; and in it lies the most powerful "philtre" that civilized man has yet found to charm him to one spot of earth. It transforms what is only a tame meadow and a bleak aspect, into an Eden of interest and delights; it makes all the difference between Araby the blest and a desert plain. It gives a bit of soil, too insignificant to find a place in the geography of the earth's surface, such an importance in the eyes of its possessor that he finds it more attractive than countless acres of unknown and unexplored territory.

In other words, it contains the mind and soul of the man, materialized in many of the fairest and richest forms of nature, so that he looks upon it as tearing himself up root and branch to ask him to move a mile to the right or left. Is it necessary to say more, to prove that it is the panacea that really *settles* mankind? But if not proven, may we not fairly assume that this "spirit of unrest" will find its quietus on the Pacific Coast, as there is no more land west of us to be explored and developed, and a repose will be allowed to the weary emigrant that has been denied him in all that territory from the Atlantic to the Sierras. As a result, horticulture in California, in its æsthetic as well as in its financial features, has already entered upon the grandest period of development the world has ever witnessed.

The opportunities and possibilities for horticultural development within the borders of the State of California are positively bewildering and unparalleled in the history of man since his expulsion from Paradise. When we consider the peculiar topography of the State, which, admitting only a portion of what is claimed for it, gives us a central citrus fruit growing belt extending through nearly twelve degrees of latitude; a raisin producing district nearly as great in extent, both bordered on all sides with a territory that will produce many other semi-tropical fruits and all the deciduous fruits known to the civilized world; climate, healthful and invigorating, and free from the extremes of either semi-tropic or semi-frigid zones; a wealthy and populous continent for a market, and, over all, a stable and prosperous government at peace with all the world "and the rest of mankind," we must admit, I repeat, that we are not extravagant, when we claim that the conditions for the future growth of horticulture in California are unequaled and unparalleled in the history of nations.

Our State Board and horticulturists occupy enviable and yet responsible positions, and in providing for the cultivation of the finest varieties of fruits and flowers, and the introduction to all parts of the State these, and the finest species of vegetable productions, they are engaged in a work that entitles them to the cordial support of every city, town, and hamlet of the State.

Therefore, in common with my fellow citizens of Riverside and vicinity, I take great pleasure in greeting so many distinguished workers in the different departments of horticulture, both from home and abroad, and in behalf of our fruit growers and citizens generally, at whose request you are here assembled, I extend to each of you a cordial welcome to our place and to our homes.

In response to a call from the President, the Secretary read the following valuable essay, prepared by **Mrs. H. H. Berger**, of San Francisco, on

JAPANESE FRUITS.

It is from Asia, the cradle of the human race, that all our superior varieties of fruits are derived; and although the fruits of Japan and China are comparatively of recent introduction, they have steadily grown in favor with the horticulturist and grower of trees—with him who plants a tree for profit, as well as with him who plants a tree for his own use.

The climate of both northern and southern California is very similar to the climate of northern and southern Japan. The soil in Japan, as well as in our State, is to a great extent volcanic. Both have a marked dry and wet season. Not sufficient has really come to our knowledge of the manner of growing and methods of cultivation of the Japanese gardens, excelling, as they do, in the art of grafting and propagating.

First in importance amongst those fruits, which of late years have won favor with us, is the persimmon. We all know the persimmon is indigenous to American soil, growing wild in the Southern States. Though originally, in all probabilities, of the same stock, the difference between the American persimmon and its Japanese relation is so marked that the most casual observer would notice it. This difference is assuredly owing to uncultivation on our part; and, on the other hand, the perfected Japanese persimmon has been produced by years and years of careful selection of good and rejection of worthless varieties, on the part of the Japanese, until there are now grown in Japan over twenty distinct and desirable sorts, all of which differ greatly in shape, color, size, and quality—as do our apples or pears—some being oblong, like a long acorn; others flat or round, resembling in shape and color a large red, or orange yellow, ripe tomato. All the persimmons are remarkable for being very harsh and astringent before maturity; but some of them become luscious and highly nutritious when ripe, especially after exposure to frost; others are difficult to free from their natural austerity, and never become edible in a raw state, even when ripe. It is owing to this very fact that the persimmon, desirable as it is in every way, has fallen into disfavor with many. Fruits of the varieties described above, as being unfit to be eaten, when raw, have been put on the market by growers, who themselves were ignorant on this point, and purchased, were pronounced naturally by the buyer as totally worthless—as indeed they were—before being dried or subjected to some other process. But many varieties are delicious and edible from the tree, making a superb and attractive table fruit.

As we possess among our apples and pears varieties which become valuable only if used for drying or cooking, thus it is with the persimmon. The Japanese dry this fruit by peeling it with sharp wooden knives, when still hard, drying it on strings. This dried fruit is packed into wooden cases, tightly covered with a lid. After a short time the saccharine substance begins to appear, clothing the surface of the fruit with a sugary, white coating. Unfortunately, owing to the long transport by sea, the influence of the salt air has, so far, never allowed us to receive dried fruits sent from Japan in perfect condition—a slight mold infesting the same. No doubt home-grown fruit could, with the far superior facilities we possess for evaporation, soon be made to excel the foreign article, and equal in value the dried figs. The soil most adapted for the planting of the persimmon tree is a gravelly clay loam, in a situation neither too dry nor too damp. Free space is necessary. The tree requires manuring once in winter, or what we consider our winter season, after the fruit is picked. The manure is best applied in a circular furrow, dug on the ground around the trunk of each tree. The trees must be pruned each alternate year in early spring or autumn. This pruning is done by the Japanese by simply breaking the branches with the hand, without using any knife, because they maintain that the contact with iron is injurious to the tree.

The varieties of persimmons are propagated by grafting, the seedlings themselves taking years to come into bearing, and the fruit being invariably astringent. The best proof of the growing favor this fruit is attaining is the increasing demand for the tree, of which thousands are exported every season, and which are brought by us to San Francisco at less cost than home producers would furnish them, labor in Japan being of so very little value. The tree is a rapid grower, very prolific bearer, highly ornamental in appearance, forming, with its glossy, dark green leaves and bright colored fruit a pleasing sight. It grows straight in pyramidal form;

the wood is valuable on account of its excessive hardness, gaining, as it grows older, a black hue, like ebony.

Given reliable varieties of trees, and the proper treatment of same, the persimmon tree will, in a short time, be considered a necessary adjunct to any orchard in those latitudes where frosts are not heavy enough to kill it. It can stand in its home from ten to fifteen degrees above zero.

Of the varieties most to be recommended for table use, *i. e.*, edible from the tree as soon as ripe, are:

The Hyakume—This fruit is very large, roundish oblate; skin, vermilion red; shows black marks at the end when quite ripe. Has few seeds. Flesh is rusty brown, with many purplish dots; it is juicy, very delicious, one of the best; ripens end of October.

Kuro Kume—This fruit is medium, oblate—somewhat four-sided; skin, bright red, black marks at the end when ripe; flesh is crisp, rusty, scattered with many black, purplish dots; juicy and sweet.

Dai-Dai-Marn—This fruit is large, oblate, four-sided. Skin, yellowish orange; flesh, pale yellow, juicy, sweet; has very few seeds.

Zenji-Marn—Fruit is medium sized, round; skin, red, marked with black at the end when quite ripe. This fruit ripens about middle to end of September on the tree, but is not good to eat then; left on the tree until after exposure to frost, it becomes sweet, juicy—one of the best for table use. It is sold abundantly in the Tokio market during the season.

Yedo-ichi—This fruit is large, roundish, a little flattened at the stem. Skin, red, marked with black lines at the end. Flesh, rusty brown, purplish black dots scattered through it; very juicy and sweet, with a delicious, rich flavor. Ripens in the beginning of October; one of the very best. This tree is exceedingly hardy and vigorous and a prolific bearer.

Yemon—The fruit is large, round, flattened, four-sided; skin, orange color; flesh, pale yellow, containing hardly any seeds; it does not lose its astringent qualities naturally. To make it delicious, the ripened astringent fruit is packed in clean casks or tubs covered tightly with a lid, when in the course of ten or fourteen days it is fit for use.

Haihija—This fruit is very large, pointed, a little flattened at the stem; skin of a rich, deep red color, which shows black marks at the end when quite ripe; has few or no seeds. It never becomes sweet naturally when ripe—but treated like our California lemons, that is, wrapped or laid between straw for a time, it is a delicious fruit. It is also much used for drying.

Tane-nashi or seedless, owing to its containing no seeds, or very rarely a few, is a very large fruit, oblong, pointed; skin, a high yellowish color. It is only used for drying, and, together with Haihija, one of the best for that purpose.

There are many varieties of the Diospyros Kaki, or Fruit of the Gods, under cultivation in Japan, which, after thorough investigation, will be worthy of importation and propagation. From Japan comes to us the

Mammoth, or Giant Chestnut,

So called from its extraordinary size, it being not uncommon for twelve nuts to weigh one pound. A further commendable feature of this tree is its coming to bear when exceedingly young, four to five years from the seed, and two years from the graft. It is an as yet disputed point which is the most profitable and best method to plant and raise this tree. Not being able to speak from personal experience, we have to rely on the reports of our customers.

Mr. Wm. Parry, of Riverton, New Jersey, a recognized authority on horticultural matters, writes to us under date August 23, 1886, that trees grown from nuts imported by us for him, five years ago, bore some nuts of remarkable size and fine quality, larger than those produced by imported seedlings or grafted trees. Messrs. Storrs & Harrison imported through us very largely the grafted trees. From the Eastern States, as well as the South, very good reports come as to the value of the chestnut from Japan. It seems that the cold weather of the East does not injure the tree, but that it flourishes there and bears fine and large nuts. The reports from there are unanimously the same, and the demand is increasing largely. Accorded a fair trial on the Pacific Coast the same may be the verdict, as the tree is extremely hardy and a very young and prolific bearer.

The many names under which Japanese plums have been introduced—the importation of some European varieties as Japanese—have in some measure brought confusion into the chapter of this fruit. Amongst the best and most valuable is undoubtedly the one introduced some years ago by Mr. Kelsey, of Berkeley, and named after him. In Japan this variety is known as Botankio, of which the Hattankio is a variety. This latter differs from the former in nothing except the bloom; it is like the Kelsey, or Botankio—heart-shaped, thick in flesh, small pit, fine vinous flavor; but whereas the Kelsey is covered with a rich, reddish bloom the Hattankio's bloom is yellow. Both are excellent—a fine shipping plum, and good for drying as well as for table fruit.

The Urrase, a large, round, reddish blue plum, ripening early, of a very fine flavor, and juicy.

The Nagate ripens a little later than the Urrase—shape roundish oblong, bloom greenish red.

Lastly, a yellow, egg-shaped plum, sweet and juicy, called by eastern nurserymen sometimes Ogon—many times Ogden. In the matter of plum trees, the various names having caused some confusion make it desirable for the purchaser to be sure to receive what stock he wishes to buy.

The Japanese Orange Family

Claims to have about forty different members. All the sweet seedless resemble each other in shape, flavor, and differ but little in size—they never attain more than two to three inches in diameter—but are, on account of their very agreeable flavor and juiciness, highly to be recommended. The tree in Japan is always grafted near the root, not two or three feet above the ground. Its habit and growth is scrubby, or bushy; it reaches a height of from twelve to fifteen feet, when its branches are literally laden with fruit. It would recommend itself highly on account of its fruit not only being very delicious, but also being most desirable for market purposes. The large, luscious Navel and Riverside oranges command such a high price that they are only within the reach of our wealthier classes. It is as an orange for the smaller purses that the Japan would be invaluable, as it could be sold, owing to its smaller size, at a lower rate. The tree bears very young. We had this fall trees about one and a half feet high which, after the long voyage, arrived with fifteen to twenty oranges on the branches.

The seedless sweets are known in Japan under many different names. They are comprised here under the appellation of Mandarin orange. Their habit is the same. They are all equally hardy, and it would be difficult to name any one preferable variety. The fruit is certain to find here a good market, as it combines all the qualities of a fine orange—thin rind, few or no seeds, very juicy, agreeable flavor. The fruits brought here from Japan are rather a poor criterion, as, if picked fully ripe, they might spoil on the way; if picked unripe, they cannot be as good as if ripened naturally. Our horticulturists can in a short time, by making a trial on a small scale, determine the value of the different varieties and judge for themselves.

The orange tree from Japan is rather hardy; and mature trees can bear a frost of twenty-four to twenty-six degrees Fahrenheit. Still, very young trees cannot be said to grow where the ground is frozen solid from November until February, as has been asserted.

A distinct branch of the Japanese orange family is the Kin Kan Mikan orange, or

Citrus Japonica,

A fruit which blends the orange and lime. There are two distinct varieties of this fruit, one an oblong, the other a round fruit. They attain the size of about a medium sized plum or apricot, respectively. The tree is hardy, bears extremely young, the fruit hanging on the branches in the greatest profusion. We had plants fifteen inches to twenty-four inches high on which we counted seventy-six citrus fruits. It does not claim to be a table fruit, though even eaten raw it has a very agreeable flavor; the rind can be eaten with the flesh, being not thicker than the skin of a plum or cherry. It has a decided aromatic orange flavor; the flesh is very juicy with the subacid quality of a lime, very cooling and refreshing, containing two seeds. The main value of this fruit will be for preserving and crystallizing. For this purpose it is eminently adapted. It is not necessary to take off the skin, on account of its extreme thinness. The aroma of the rind blending with the acid of the flesh will make it one of the most desirable fruits for preserves, jellies, and crystallized fruit. Mr. Luther Burbank, of Santa Rosa, who purchased some of the trees from us this season, cannot speak too highly of them. It is a tree which will soon gain favor and stand on its own merits, once known among California's horticulturists. It does not, like all Japanese orange trees, attain any considerable height, its growth being very bushy, with long divergent branches, ten to twelve feet being its height—it were then that our glorious climate would coax it nearer the heavens.

The Japanese Loquat,

Also called Mespilus Japonica, Eriobothrya Japonica, or Japan Medlar, of which there is only one variety, some called Giant Loquat, on account of the size of its fruit, which is simply the result of the richer ground in which it is planted. This tree grows to be very large, is evergreen, blooming in fall towards the close of the year, maturing its fruits in spring. The latter are of agreeable flavor, shaped like a yellow plum, well worthy a trial and the attention of orchardists; is a fine table fruit, and very desirable for jellies and preserves. Might also be useful for evaporation.

No peaches or pears, native of Japan, are fit to eat. The pear seedlings make excellent stock for grafting on account of their vigorous growth, and being peculiarly free from disease. There is no fig in Japan, native, the black and white Ischia, imported from there, being far inferior to the varieties which we possess here in the White Smyrna, San Pedro, White Adriatic, and White Genoa.

The Chinese Honey peach and Tippon will, in time, prove a valuable acquisition to our orchards.

Mr. Wilcox: Mr. President, it may be of interest to many of those present to know what disposition was made of this kind of fruit from California, at the Exposition in New Orleans two years ago. We had persimmons there from this part of the State, and they were well received, and considered the most choice fruit on exhibition, keeping well until February. The persimmon grows naturally in the Southern States, but not to the perfection of the Japanese. We had also on exhibition the American, the Japanese, and the Chilian chestnuts, from Santa Clara County, as well as from San Bernardino County and Sonoma. This fruit grows here, as well as in the Southern States, and is considered quite an acquisition. A great many people like them and would probably like to hear a discussion of the subject. The fruit was exhibited at New Orleans, but before the judges finally decided upon them they became somewhat injured, but the State Horticultural Society collected the best of them at the time (in February). They embraced some from the southern portion of the State and some from Sonoma. They were taken in behalf of the State Horticultural Society for the exhibit.

Mr. Klee: Mr. President, I think there is a great deal that might be said about the Japanese fruits. Many of them are quite promising. There is an important fact in regard to Japanese persimmons that I think is not generally known. All the Japanese persimmons that are good are grafted or budded on seedlings, but it has been proved here in California that the European persimmons were far better and more profitable. The Japanese persimmon grows like an oak and you can hardly get it to form any such roots. The European persimmon, on the contrary, has a fine root system and is far more profitable, can be planted and handled easier, and the trees grow finer. Some were planted at one time in Santa Clara, but owing to an unhappy accident, a very severe frost struck the trees just at the time they were being budded and many were killed. I think it was just an accident. I have grown the trees myself for a number of years without any trouble. It may have been because they were over-irrigated and grew very rapidly. They grow from the seeds. You can buy these from the seed stores, and in one year you will find stocks large enough to bud upon. The tree itself is substantial and quite ornamental, but its fruit, I believe, is found of but little value. The fruit produced on these trees of Japanese variety is very excellent. I would like to hear from the people living in the vicinity of Riverside as to what they think of the Japanese persimmon as cultivated in this climate. My idea is that the Japanese fruit requires a more humid climate. I have seen them in a more moist climate. They do exceedingly well in the Sacramento Basin. In Sacramento City they are very common; I think the largest I have seen are produced there. There were persimmons at the Fair that were raised at San Diego, on the seacoast, and very fine ones. I think it can be grown almost all over the State, probably, with more or less success.

As regards the Japanese orange, I think there are a good many of those that might be worth while to raise, and I know that some of them have been brought here to Riverside this season. The trees which we get from Japan are all grafted on a different stock (*Limonia trifoliata*), and I do not think that they ever grow to a large size. There is one point about that which is in its favor, and that is that it is deciduous, and in some localities the growth stops earlier in the season and there is not a tendency (at least that has been my experience) to grow all through the season. The fruit ripens earlier consequently, and that is an advantage to be claimed in its favor.

Mr. Wilcox: I grafted some trees about twenty-five years ago on quince. Those did very well. If they should do well on the quince there would be no danger to the roots. Some were also grafted on pears, but I do not know what became of them. They were set out by a Mr. Kelsey, a gentleman who is now deceased.

Mr. Klee: The loquat to which Mr. Wilcox refers is frequently grafted on the quince, but it is just as easily propagated from its own roots. The tree grows hardy all through the coast regions where I have seen it, but they bloom at a very peculiar time, just in the winter season, and are on that account liable to be hurt. They have fruited in various parts of the State; they have fruited quite largely at Niles. The fruit that was produced on them was sold at pretty good prices in San Francisco. Mr. Shinn, who sold them, thinks they were largely bought by the Chinese, who like them very much. They have a pleasant acid flavor, refreshing and pleasant, but I believe there are better varieties than those that are generally grown. I think it a mistake that is made here to say that there is but one variety of the loquat. I think there are a number, and that the Chinese have superior varieties to the Japanese.

Mr. Chester: I think that a great many of these questions arose at the horticultural office and that Mrs. Berger disposed of them. She was at Japan by the last steamer and has promised to advise us better in regard to her operations there.

Mr. Wilcox: I paid two or three dollars apiece for some trees brought here from Japan, and lost some of them which were planted in heavy soil.

Mr. Klee: There is another point in regard to the Japanese persimmon that I would like to refer to. Mrs. Berger speaks of the difficulty of bringing them over. Her husband gave me some samples years ago, of dried Japanese persimmons, brought from Japan, and although they were a little moldy, I must say that they were very fine. Probably a finer flavor could be retained if they were packed in the right manner. Still they were excellent. They were something between a fig and a persimmon itself. I think they are well worthy of consideration.

Mr. D. C. Starr, of Lugonia: I would like to say to the convention in regard to the persimmon, that I find them doing very well in our locality here on the seacoast. I live at Lugonia fifteen miles above, and at a somewhat higher elevation than this. We have three Japanese persimmons, I cannot give you the varieties, but they are all different, which have been bearing successfully for five years. I think there are two of those trees which have borne each year successfully. One did not bear last year on account of overfruiting the previous year. One of them ripens in October, one in November, and one in December. The variety which ripens in December must be laid away for two weeks before being edible, but the two other varieties are edible from the trees.

Mr. Holmes, of Riverside: We have raised the persimmon here, but I find those grown at San Diego and near the seacoast are superior in size.

Mr. Starr: We have them nearly as large, or fully as large as the orange, and in some cases larger. They are grown on sandy loam soil on my place.

On motion of Mr. Lelong, the convention adjourned, to meet to-morrow, at nine o'clock A. M.

SECOND DAY.

The ~~Mr.~~ PRESIDENT: Ladies and gentlemen, before discussing the questions for to-day, I wish to state to the gentlemen and fruit growers of Riverside, that I took a ride of some twenty miles through different parts of the city yesterday afternoon, and I was charmed with the appearance of thrift and prosperity of all these beautiful homes. I had no idea, or the least impression, that you had such a beautiful place, although living as a neighbor. I was reminded of a circumstance that happened in Santa Barbara, two years ago. A lady who was visiting from the East, and spending the winter—a woman of great wealth, and whose habits have been to make liberal donations for charitable purposes in every place where she has remained for any length of time—shortly after her arrival here engaged a livery team to take her to the county poorhouse. Her hobby was to help the indigent poor. She was driven to the county poorhouse, and shown the nature of the place, and the grounds and inmates. She asked how many inmates there were, and was told three. She left in disgust. She had no field in Santa Barbara. The insect hobby has no field in Riverside. You have no insects to fight.

It may not be out of place for me, before introducing the gentleman who is to address you this morning, to outline a little of the work which has been accomplished by this man. In 1872–3–4, when I was nearly eaten out of house and home by grasshoppers, I was compelled to make a study of insects. Through correspondence on this subject I became acquainted with Professor Riley. Also, in 1875, when I had made a large outlay and a tour of inspection of the black scale on the olive in all the coast counties, I found that the black scale had rendered worthless every olive orchard from San Luis Obispo to San Diego. Through correspondence with the London Horticultural Society, I was introduced to the President of the Horticultural Society at Montpelier, France. I was informed by that gentleman that I could get the best information at home, and that the best remedy was kerosene oil. I became a student of Professor Riley, and have carefully watched all the bulletins and publications which he has issued, one of the more important being a work on the Rocky Mountain locust, commonly called grasshopper, and one on the Colorado beetle, known as the potato bug, which some years ago created such an alarm throughout the potato growing districts of New England, the Middle, Western, and Northwestern States, but which, to-day, is scarcely thought of by any farmer in the country. The cotton worm created vast devastation throughout the cotton States, where from twenty to fifty million dollars worth of property has been destroyed in a few days, creating misery and poverty among those who received nothing for their outlay. To-day, by simple inexpensive remedies, crops are secured, and thrift and prosperity exists where before was misery and poverty.

Besides these, we have his works on the Hessian fly, the Army worm, papers prepared for the different agricultural and horticultural societies, and publications in all the scientific works, all of which has been accomplished by this single man. His works have become the standard works of economic entomology in this country and throughout Europe.

I do not wish by outlining these facts to embarrass the gentleman, but it is due to ourselves as well as to him, that we make him feel that we have the highest appreciation of the great services and the important work that he has accomplished.

ADDRESS OF PROFESSOR C. V. RILEY.

Mr. President, Ladies and Gentlemen: When I left Washington, it was with the intention of resisting all invitations to speak, as I have been suffering for some time from the effects of overwork, and desired quietly to pursue some investigations in relation to insects injuriously affecting fruit culture here, and at the same time get rest from exacting office duties. But it was impossible to resist a few invitations, and among others that of the members of your society, and the urgent appeal of your President, Ellwood Cooper. I have, however, no formal address to offer you, and simply expressed my willingness to take part in your proceedings and discussions.

The subject for which I have been announced, namely, "Entomology in its relation to Horticulture," is one chosen by some enterprising member of your Board without authority from me, and, as it is altogether too comprehensive to be dealt with without more time and more thought than I have had at command, I must state, to begin with, that I shall endeavor to confine my remarks to scale insects, and particularly to what you know as the white scale. This is the insect which undoubtedly most concerns you just now, and I have an elaborate article upon it, now going through the press at Washington. This, however, would require two or three hours to read, and I will pass over the purely historical and entomological details and touch only upon such points as will probably most interest you.

Nomenclature.

There is no doubt whatever about this insect being the *Icerya purchasi* of Maskell, and its scientific name is, therefore, fixed. In reference to its popular name, there are several in use, and as between Australian bug, white scale, and cottony cushion scale, there is very little choice, and it is, as a rule, useless to endeavor to change popular names that have once come into vogue. So far as they can be changed, however, and with a view of inducing unanimity in the adoption of a single name, it were better to reject all these names and call it the fluted scale. There are many Australian bugs, and many white scales, some of which, belonging to the genus Pulvinaria, equally well deserve that cognomen. Cottony cushion scale is both too long to be acceptable, and would likewise apply to the species of this last genus, whereas no scale insect injurious to fruit or other trees, at present existing in this country, secretes its white, waxy matter in such a perfectly fluted mass as this. The generic term, *Icerya*, if once popularized, like geranium, phylloxera, etc., has the advantage of brevity and still greater accuracy.

Geographical Distribution.

Historical evidence all points to Australasia as the original home of this insect, and its introduction from Australia to New Zealand, Cape Town, South Africa, and California. Nothing was known or published upon the species prior to the seventh decade of this century, and it seems to have first attracted attention almost simultaneously in Australasia, Africa, and America. The evidence as to whether it is indigenous to Australia or New Zealand, or to both, is not yet satisfactory. The first personal knowledge which I had of it was from specimens sent to me in 1872 by Mr. R. H. Stretch, then living in San Francisco, and all the evidence points to its introduction into California by the late George Gordon, of Menlo Park, about the year 1868, and probably from Australia, on acacia latifolia.

More light is, however, yet needed on this point, as in a recent letter received from Baron von Mueller, of Victoria, he claims that it could not have been imported on acacia into this State, as all the acacias in the State have been grown from seed. This is a matter upon which I should like to have definite information from members of this body, if such information is extant.

It is at present widely distributed in the State, and a very full account of its distribution, kindly furnished to me by Mr. Matthew Cooke, shows that there are some ten infested districts, namely: six in the counties of Marin, San Mateo, Santa Clara, Sacramento, Sonoma, and Napa, and four in the counties of Santa Barbara and Los Angeles.

Food Plants.

A very long list of plants might be enumerated upon which this insect is either found accidentally, or upon which it can live more or less successfully. But the list of plants, especially of trees which are important to us for their products, which are seriously affected by it, is comparatively limited, and will include the acacias, lime, lemon, orange, quince, pomegranate, and walnut. Some few other trees might be added, and it is particularly partial to the rose and the nettle, but it is doubtful whether the species could permanently thrive and multiply to an injurious extent on many other trees than those mentioned.

Characteristics of the Insect.

The genus *Icerya* was founded by Signoret, a French entomologist, in 1875, being based upon the single species, *Icerya sacchari* (Guerin), which lives on sugarcane in the Island of Bourbon. This species, and the one we are now dealing with, are the only two species of the genus, and the diagnosis as given by Signoret, and subsequently elaborated by Maskell, of New Zealand, is incomplete, and does not include the characteristics of the male.

In the report already alluded to, I have given a very full characterization of the species, and in all conditions and stages, but the only facts that I need draw attention to on this occasion, are: First, that the female undergoes three molts and the male two, *i. e.*, each one has one more stage than has hitherto been recognized by entomologists and observers; secondly, that it differs from all other members of its family (Coccidæ), in its extended powers of locomotion in most of its stages, in its extreme hardiness or power of surviving for a given period without food, and in its polyphagous habit, or the ease with which it accommodates itself to so great a variety of plants. These are the three characteristics which most concern you as fruit growers, and which make it one of the most difficult species to contend with.

Mode of Spread and Distribution.

All young scale insects are quite active when they first hatch, and most of them, at this time, are extremely small, and when very thick upon a tree, instinctively, or at least very easily, drop from the terminal twigs and branches. Their specific gravity at this time is so light that they are easily wafted with wind in their descent. This general truth applies with equal force to the *Icerya*, and is rapidly carried from tree to tree, and from orchard to orchard, by the agency of wind, by running water, or by birds and other insects. Another local means of transporting, not to be ignored, is upon the clothing of persons engaged in cultivating, upon packages, and upon all implements used, whether in cultivating or harvesting the crop. This particular species also has quite a habit of crawling over the ground, and its local spread is very materially enhanced thereby.

It is carried long distances, however, chiefly by high winds, birds, and commerce, and its introduction from one continent to another has undoubtedly been effected by the latter method upon young trees or cuttings.

Natural Enemies.

No bird is known yet to attack this insect in California, and but one is mentioned even in Australia, and that upon very slight evidence. Predacious of insects, a species of Lacewing (genus *Chrysopa*), has been observed to feed upon it; as also the ambiguous ladybird (*Hippodamia ambigua*). The larvæ of a little moth, which I have described as *Blastobasis iceryæella*, is also known to feed upon the eggs. Among the heteropetera, or true bugs, quite a number have been found upon the trees infested with the insect, but none have yet been noticed to feed upon it. The most important of its insect enemies is a species of earwig not yet identified, and a number of mites not yet carefully studied.

Of true parasites, none have hitherto been reported, whether in Australia, Africa, or America, but I am glad to announce that two specimens of a minute chalcid fly have been bred by me from specimens around Los Angeles, and will be described by Mr. Howard, who makes a specialty of the family, under the name of *Isodromus iceryæ*.

The genus is new to our fauna, and the probability is that it was introduced from Australia with its host.

Preventive Measures.

Most of the members of this society are doubtless aware that for some five years I was conducting a series of very careful experiments with a view of controlling the scale insects and other insect pests that injuriously affect the orange trees in Florida. This work was carried on through the instrumentality of Mr. H. G. Hubbard, and the department has published a special report prepared by him upon this subject. All that is said in that report in reference to the value of preventive measures against the scale insects of that part of our country will apply with equal force here in California.

The value of cleanliness, of thorough cultivation, of pruning judiciously, so as to get rid of all the dead wood, and to open the top of the trees to the light and to the sun, and to facilitate the spraying of the trees, need scarcely be emphasized. There may be some difference of opinion as to the value of pruning, while different kinds of pruning, or no pruning, will have their advocates here, as they have had elsewhere. The orange makes, naturally, a very dense head; and in the moist climate of Florida, where they have a much larger average of shade, cloudiness, and moisture than you have here, judicious pruning has all the advantages stated; and whether needed or not in California for the purpose of more fully ripening and maturing the fruit, I am quite satisfied from what I have seen that it is just as much needed to facilitate proper spraying of the trees, and to prevent over-production.

Some years ago, and prior to the discoveries resulting from the investigation in Florida just referred to, the inadequacy of most washes caused many of the orange growers of that State to cut back their trees most rigorously, leaving little more than the main trunk, in the hope of thus being able to kill out or exterminate the scale insects that troubled them there. I find that many of your orange growers are going through the same sad experience, and resorting to the same sad means. It is a pity to find men thus reënacting a farce, which has been proved in another part of the country to be quite unnecessary. Such wholesale lopping of limbs requires much labor; and even with the greatest care, which is seldom bestowed upon it, the tree receives an immediate and material injury, and is destined to suffer still more in years to come. Moreover, this radical means often proves absolutely futile, so far as the results aimed at are concerned; and unless the greatest precaution is taken to properly cover and heal the stumps, and to absolutely kill all the insects upon the remaining trunk, as well as those upon the several branches and the ground, the new growth will soon be as effectually infested as was the old. Many of your own growers have thus lopped, or are now cutting back their trees in a very blind way, and without the precautions here indicated, on the popular but erroneous supposition that with such precautions they will get rid of the troublesome scales. It makes my heart bleed to see such reckless—I had almost said wicked—treatment of a beautiful grove.

The value of shelters, in the form of surrounding trees and windbreaks, is, I am sure, just as appreciable here, if not so much to protect from frosts and winds, fully as much to protect from infection from scale insects. A row or tall hedge of coniferous trees, such as your cypress, upon which the scale insects will not thrive—or, better still, a belt of the same—will often serve as an effectual screen to prevent the young insects from being carried from an infested to an uninfested grove.

But, before passing this subject of preventive measures, I must not omit the importance of any effort looking to preventing the introduction of this insect from one section of the country, or from one neighborhood, to another. No insects so easily bear transit as these scale insects, and it is eminently true of this particular *Icerya.*

All the worst species from which they suffer in Florida have been introduced from abroad. Their long scale (*Mytilaspis gloverii*) was introduced about the year 1835; their chaff scale (*Parlatoria pergandii*) from Bermuda, some twenty years later, and their red scale (*Aspidiotus ficus*) from Havana, in 1879.

We have already seen how this *Icerya* was introduced into your State from Australia, and the next worst species which you have to deal with, namely, your red scale (*Aspidiotus aurantii*), was likewise introduced, so far as the evidence goes, from the same country.

To enumerate merely the different species of insects destructive of your fruit interests that have been introduced from other parts of the country, or from other parts of the world, would consume too much time, and I cannot attempt to do so. But I would lay stress upon this conviction, which has forced itself upon me after a pretty extended experience in all parts of the country, namely, that however much you should encourage all coöperative efforts to prevent such transferring and spread of injurious pests, they cannot be fully exterminated when once they obtain a foothold, and in the end each individual fruit grower must depend on his own efforts.

Remedies.

It follows without saying that what we should seek in any direct remedy is, first, perfect killing power; or, to be more exact, perfect insecticide quality associated with harmlessness to the tree; second, reasonable cheapness.

I will not detain you with any general remarks on the subject of insecticides, because it has received full attention in my official reports. Dry insecticides have been found in the main unavailable here, and we must depend upon washes, or materials in solution, that may be sprayed upon the tree. Here, again, I would remind you of the careful and extended experiments conducted by Mr. Hubbard under my direction in the orange groves of Florida with a view of solving the important question as to what is, on the whole, the most satisfactory liquid application, cheapness and efficiency considered. Carbolic acid, creosote, sulphureted lime, silicate of soda, sulphuric acid, sulphurate of iron, bisulphide of carbon, and many other materials, have been thoroughly tried, as well as whale-oil soap, potash, and soda lye, and their various combinations; but in the end nothing proved equal to emulsified kerosene. Whale-oil soap is an excellent means of destroying some insects upon some plants, but it is dearer in the East than kerosene and fails to kill the eggs of our insects, so that, however good it may be for scrubbing the trunks and branches of a tree, I cannot conscientiously urge it as, on the whole, satisfactory, particularly as it is known to stain the fruit, and because of the many different grades, varying in their effect and in their value, which are upon the market. Potash and soda lye injure the tree more than kerosene does and do not destroy the insect as well; admirable though they are as washes in weaker solution for some other purposes. The action of sulphureted lime (flowers of sulphur boiled in milk of lime) is very similar to that of caustic potash. Notwithstanding the kerosene emulsions, in proper proportions, have proved so satisfactory against the scale insects of the orange in Florida, they have, as a rule, failed to win the good opinion of the orange growers in California. I have always believed the want of success in this State with the kerosene emulsions was due to imperfect preparation of them, or to imperfect application. I was inclined to give some credence to the theory advanced by my old friend, Prof. E. W. Hilgard, who is so keenly alive to everything that interests you, and whose services have been so invaluable to the agriculture and horticulture of the State, namely, that the dryness of the atmosphere in California induced a more rapid evaporation of the kerosene, which may partly account for the difference in experience between the Atlantic and the Pacific. For these reasons, I had long desired to make a series of experiments in California, and finally, last year, did have such a series carried on by Messrs. D. W. Coquillett and Albert Koeble. It were difficult to find in the whole State two gentlemen combining in the one instance more care and reliable entomological capability, and in the other more industry, earnestness, and enthusiasm, and this I say without desire to flatter, but as evidence that their experiments, so far as they went, were trustworthy; in fact, I may say the most careful and thorough that have hitherto been made. These experiments extend over a period of three months in the spring and three months in the autumn, and the detailed reports which these gentlemen have made will be published in connection with my forthcoming annual report. They show that the kerosene emulsions must still be placed at the head of the list of washes, not only for ordinary scale insects, but for this *Icerya*, or fluted scale. Among the different substances thoroughly experimented with were caustic potash, caustic soda, hard and soft soaps, tobacco, sheep dip, tobacco soap, whale-oil soap, vinegar, Paris green, resin soaps and compounds, and so on. It is impossible to give even a digest of the very many experiments and the varying results obtained with the different washes. It suffices to say, that the kerosene emulsion diluted with from eight to ten parts of water was found to kill all the eggs, as well as the old females, and that, even when used still stronger, it left the tree uninjured. Mr. Coquillett reports with reference to the much praised caustic soda that it has no effect on the eggs of this scale, even when applied so strong as to burn the bark and kill all the leaves. Similarly, the whale-oil soap does not kill the eggs directly, though it may harden the egg-mass so as to prevent the hatching of a large proportion of the young larvæ.

Mr. Koeble, experimenting through August, September, and October, found similarly good results from the kerosene emulsion, but that the crude petroleum, although much cheaper, was more apt to injure the tree. His attention was, however, directed mainly to the preparation of resinous soaps and compounds on account of their greater cheapness. He succeeded in making a number of these mixtures, which, when properly diluted, need not cost more than one half to one cent per gallon, and which produced very satisfactory results, killing the insects, or either penetrating or hardening the egg masses so as to prevent the hatching of the young. There is some slight difference between the experience of Mr. Koeble and Mr. Coquillett as to the value of soap washes, and the greater success which the former had with them as compared with the latter was probably due to the fact that his experiments were made during the dry or rainless season. The great point of interest, however, in these experiments is that they confirm in a remarkable manner the experience had in Florida. And I think that you will agree with me that they justify the opinions which I have expressed in official writings. Such observations as I have been personally able to make during my brief sojourn among you have greatly served to confirm in me those opinions, and while the resin soaps experimented with by Mr. Koeble are a valuable addition to our insecticides for our scale insects, I find the experience in Florida repeated here, and all the more satisfactory washes have kerosene as their effective basis. There has been, however, a very great waste in applying it, and it is in this direction that reform is most needed.

The fact cannot be too strongly urged that in the case of this *Icerya*, as of most other orange feeding insects, it is practically impossible, with the most careful and thorough spraying, to reach every one of the myriads on the tree. Some few, protected by leaf curl, bark scale, or other shelter, will escape, and with their fecund progeny soon spread over the tree again if left unmolested. Hence, two or three sprayings, however far apart, are far preferable to a single trial, however thorough. And this is particularly true of the pest we are considering, which lives on so many other plants and which, in badly infested groves, is crawling over the ground between the trees.

It is now the custom to use the time of a team and say two men for fifteen or twenty minutes, or more, and thirty, forty, or fifty gallons of liquid on a single, medium sized tree. In this way the tree is sprayed until the fluid runs to the ground and is lost in great quantities, some growers using sheet-iron contrivances around the base of the tree in order to save and re-use the otherwise wasted material. Now, however much this drenching may be necessary, or has come into vogue, in the use of soap and potash, and soda washes, it is all wrong so far as the oil emulsion is concerned, as the oil rising to the surface falls from the leaves and wastes more, proportionately, than the water.

The essence of successful spraying of the kerosene emulsions consists in forcing it as a mist from the heart of the tree first, and then from the periphery, if the tree is large, allowing as little as possible to fall to the ground and permitting each spray particle to adhere. It is best done in the cool of the day, and, where possible, in calm and cloudy weather.

There has been no morning since my sojourn among you that I have seen the sun rise in a clear sky. Cloudiness has prevailed for some hours after dawn, and, in this regard, it seems to me you are favored, as this would be the time of day of all others to spray. Proper spraying should be done with one fifth of the time and material now expended, or even one tenth of that which I have seen wasted in some cases, so that three sprayings at proper intervals of about a month will be cheaper and far more satisfactory than one as ordinarily conducted. In this particular, neither Mr. Coquillett nor Mr. Koeble's experiments were entirely satisfactory, as I was too far from the field to permit of the detailed direction necessary.

I cannot emphasize the fact too strongly that it is practically impossible to eradicate, by any system, every individual insect and egg upon a tree in one spraying. It is almost futile to attempt to do so.

Let us now see whether the kerosene emulsion, pure and simple, can be improved upon by the addition of any other material? It is plain to be seen from the official circulars and documents that have been published in the State and distributed among you, that, in many cases, the proper use of kerosene has been entirely misunderstood. Having already seen that it destroys the eggs of *Icerya* only when used in the ratio of one part of kerosene to about seven or eight of the diluent, it follows that any lesser amount will give less satisfactory results. Moreover, it is extremely important to prepare the emulsion properly. This has usually been done by the use of milk or of soap, because they are cheap and satisfactory. Raw eggs and sugar and other mucilaginous substances may be used. Experience has shown that the best proportions are two parts of the oil to one of the emulsifying agent, whether milk or soap, *i. e.*, for instance, two gallons of the oil to one of milk, or one of the soap water made by dissolving half a pound of soap in one gallon of water. So long as these proportions are maintained, a large quantity can be emulsified as rapidly as a smaller quantity, and violent agitation through a spray nozzle, at a temperature of 100°, and as frequently described in my reports, gives the quickest results.

Take, for instance, the mixture recommended by your County Board of Horticultural Commissioners. You will find that with the soap and wood-potash there are twenty-five parts of the diluent to one of the kerosene recommended, and there is every reason to believe that the kerosene in this wash might just as well be thrown away, and that it adds comparatively little, if any, to the efficiency of the wash, at least for the fluted scale. If, on the contrary, we would add to the ordinary emulsion any materials that would give greater adhesiveness, such an addition will prove an advantage. Such we get, to some extent, in the soap emulsion, for which reason it has a slight advantage over the milk emulsion. And after examining the trees treated with resin washes, I am strongly inclined to recommend that these resin washes be used as the diluent to the soap emulsion made after the usual formula. Something was tried some years ago by one of my agents in Florida, Mr. Joseph Voyle, who used fir balsam in place of resin, in connection with the oil emulsion, and obtained most satisfactory results. Dextrine, or yet better, flour, if mixed with the wash, would prove valuable for the same purpose.

Again, if permanency can be given to the effect of a wash so that the few insects escaping the first application, or, which would hatch out thereafter, would succumb, such addition would be invaluable, and though the arsenites are, as a rule, effective, chiefly against mandibulate insects, or those which masticate their food (in other words, although the action of these poisons is mainly through the stomach), yet I happen to know from experience that they have also a direct effect by contact. Therefore, I recommend, with considerable confidence, that in this dilute kerosene emulsion there be added a small proportion of arsenious acid, say, from two to three ounces to every fifty gallons of wash. This arsenious acid may be prepared and added in various ways. Probably one of the simplest would be to take half a pound of arsenic to half a pound of sal-soda, boil this in one half gallon of water until the arsenic is dissolved, and mix this with about one hundred gallons of the diluted emulsion. A quarter of a pound of London purple to fifty gallons of the diluted emulsion, or even a still greater amount would, perhaps, serve the same purpose, and be less likely to injure the tree.

I am aware of the danger of making recommendations that have not yet had thorough trial, but I have already made a few limited experiments (and intend making more) which would seem to justify these, and at all events, if care be taken not to use too large a quantity of the arsenic, no harm will result from it, either to the tree or to those who use the fruit.

Kerosene is not so cheap as the resin compounds, or as some of the soap and lye washes, but it has the great advantage that it can be used in much less quantity. It permits a great reduction in the amount of material and the cost of labor. At the rate of 20 cents per gallon wholesale, the effective wash will cost 2½ cents per gallon, and from one to two gallons are sufficient, if properly sprayed, on a medium sized tree.

Spraying Apparatus.

Just as there is a great wastage of time and money in drenching a tree with kerosene emulsion, so the spraying nozzle most in vogue with you is also somewhat wasteful. That most commonly used is the San José nozzle, in which the water is simply forced through a terminal slit in a narrow and rather copious jet of spray. It is the force and directness of the spray which gives this nozzle its popularity under the mistaken spraying notions that prevail, and to this I should probably add the fact that, being a patented contrivance, it is well advertised and on the market, for somehow or other people rarely value a gift as much as what they buy, and too often rate value by price. The Cyclone nozzle, which has proved so satisfactory in the East as well as to my agents at Los Angeles, has scarcely had a proper trial among you, so far as I have been able to see, to properly impress its advantages. That originally made and sent out by the late G. N. Milco, of Stockton, was patterned in size and form after one which I sent him and which was designed to spray from near the surface of the ground.

What is designed for the orange grove, or for trees, is a bunch of nozzles of larger capacity, the size of the outlet to be regulated by the force of the pump. I have witnessed all forms and sorts of spraying devices, and, while there are many that are ingenious and serve a useful purpose, I can safely say that there is no form which will produce a spray so easily regulated and altered to suit different conditions, and which is so simple and so easily adjustable to all purposes. Since among you I have endeavored to get a bunch nozzle, such as I would recommend, made at Los Angeles, and the difficulties I have had in getting it made properly illustrate, perhaps, some of the reasons why this nozzle has not become more popular on this coast. All the parts must be well fitted, the inlet must be tangential, and the outlet so made as not to overcome the whirling or cyclonic action of the water. The breadth, directness, force, or fineness of the spray are all regulated by the form and size of the outlet, and if a thick cap be used it must be gradually countersunk on both sides until the thickness at the outlet does not exceed one sixteenth of an inch. A bunch of four nozzles, one arranged so as to have the outlet distal or from the end of the piping, which may be ordinary gas pipe, and the other three in bunches, so that the outlet is at nearly right angles, each about an inch below the other, and so placed that they are one third the circumference of the main pipe apart, will be found, I think, most serviceable in your groves. Such a bunch working from the center of an ordinary sized tree will envelop it in a perfect ball of mist. For tall trees a more forcible stream might be had from the end by substituting an ordinary jet with a wire extension.

This is a recent device first brought to my attention by Mr. A. H. Nixon, of Dayton, Ohio, and for sending a fine spray for a great distance it has advantages over the cyclone nozzle or the San José nozzle. It is simply an extension screwed over an ordinary nipple, the end of the tube being covered with the wire netting which breaks up the liquid forced through it. The brass nipple should be about one inch in length, the perforation very true and varying in diameter according to the force of spray desired. The nipple screws on the discharge pipe, and upon a shoulder threaded for the purpose is screwed a chamber or tube about one inch in diameter and three inches long, to the outer end of which is soldered a piece of wire gauze varying in size of mesh to suit the force and the size of aperture in nipple.

Finally, if a service of blind caps and several sets of cyclone nozzle caps of varying aperture are kept on hand, the spraying may be adjusted at will to condition of wind, size of tree, etc.

Your worthy President has very well remarked that what we want is not generalization, but hard facts and experience presented in the simplest and briefest manner. If I have dealt somewhat with principles, rather than with details, I shall look for your excuse in the fact that a very large experience presents such a multiplicity of details as to warn me from entering into them.

Fumigation.

Fumigating trees will always have, *cæteris paribus*, some disadvantage as compared with spraying. The mechanism is more cumbersome, the time required for treatment and the first cost in making preparation greater, and these facts will always give spraying the advantage with small proprietors, and those who are dealing with young trees. Sulphur fumes have been tried, but they burn the leaves and injure the tree. Tobacco smoke and vapor fail to kill the eggs. Ammonia is excellent, but fails to kill all, though I have known the most beneficial results from the ammonia arising from sheep manure used as a fertilizer in apple orchards. It will be difficult, therefore, to find a mode of fumigating that will be harmless to the tree and deadly to the insects, and at the same time as rapidly and as easily applied as a spray.

Many of you already know that Mr. Coquillett, in connection with Mr. Alexander Craw, and Mr. Wolfskill, of Los Angeles, have for some time been conducting a series of experiments which led them to believe that they have discovered a gas which possesses the requisite qualities. The trees which I have examined that have been treated with this gas, both there, at San Gabriel, and at Orange, lead me to the conclusion that they are fully justified in this belief, and several ingenious contrivances have been perfected in Los Angeles County which give promise of great utility and feasibility. Whether the trees are left uninjured, it is perhaps premature to say. That they are affected is evident in some cases, and what the ultimate effect will be, time alone will decide. Let us all hope that the promise of this gas will be abundantly fulfilled. Let me add, however, that even if it be found that no solitary insect or egg will escape treatment with this or any other gas, fumigation will yet no more fully exterminate or free the orchard than the proper spraying of the kerosene emulsion, but for the reasons already stated, will have to be repeated. In other words, one application, however perfect in destroying insect life, cannot and should not be depended on. The disadvantage about this gas, in my estimation, is that it is kept, so far, a secret. We cannot, perhaps, blame the gentlemen for endeavoring to realize something out of what they consider a valuable discovery that will compensate them for the time they have devoted to the purpose; but I am always suspicious of secret or patent insect remedies. My friend Mr. Coquillett worked at this gas after his employment by the Department of Agriculture ceased. But it is a general truth that the moment any person becomes interested in a patent or in any remedy they desire to control, from that moment their judgment can no longer be depended on as to the value of other remedies. I have been asked why Mr. Coquillett was not continued in the service of the Department for a longer period, and it is perhaps due to the fruit growers of California and to him to explain why the experiments which he began were interrupted. It had been my desire to have two agents permanently located on the Pacific Coast to carry on the work of my division here, for I have long felt that your fruit interests, to say nothing of the other agronomic interests of the State, demanded such recognition at the hands of our National Government. It so happens, that in my desire to aid other investigations that bear upon the promotion of agriculture, I took part in urging the creation of a division of ornithology and mammalogy for the purpose of having inquiry made into the habits of birds and mammals, so far as they affect agriculture and horticulture. The friends of ornithology were successful in getting that division created, but were unable to get an appropriation to carry on the work, except by taking it out of the appropriation for the entomological division, and during my absence from the country last June, and after all my arrangements had been made for work on the Pacific Coast on the basis of the appropriation bill passed by the House of Representatives, the amount was cut down in the Senate given for the ornithological work, thus requiring the discharge of a number of those already engaged, and restricting the work of the Department in entomology.

Bandages Around the Trunk.

There is always danger that a tree once sprayed or disinfected will get reinfested from the insects that have not been reached upon adjacent plants or upon the ground, and which in time may crawl up on the trunk. Any of the sticky bandages used for the canker worm will check this ascent, but when the sticky material is placed directly on the trunk it may do more harm than good. It should, therefore, be placed upon strips of tar or other stiff paper tied by a cord around the middle, the upper end flared slightly outward, and the space between it and the trunk filled with soil to prevent the young insects from creeping beneath. Cotton should not be used for this purpose, as birds, for nesting purposes, carry away particles of it which may contain the young insect and may thus help to disseminate them.

Legislation.

Next to the destructive locusts which occasionally ravage our grain fields, no other insect has perhaps been more thoroughly legislated against than this *Icerya* in California. Indeed, the manner in which the people of this State have taken hold of this insect question and have endeavored by all legislative means to enforce such action on the part of fruit growers as best subserve the interests of the whole State is highly commendable. Yet, while much good has undoubtedly resulted, the laws have too often proved inoperative, either through the negligence or ignorance of those appointed to execute them, or still more often through the indifference or opposition of individual growers, or unwillingness of the Courts to enforce the laws with vigor. And while the greatest coöperation should be urged, and, if possible, enforced in battling with these insect pests, yet, so far as this particular species is concerned, no human endeavor can now exterminate it from the country. It has come to stay, and nothing has more fully forced itself upon my conviction than that in the end, with all our laws, each orange grower must depend upon his own exertions. It is, therefore, fortunate that the pest may be controlled by such individual exertions. While, however, we must admit that it is beyond our power to fully eradicate it from those districts in which it has obtained a foothold, the case is quite different when it comes to restricting its spread, and it is in this direction that wise legislation and the strict carrying out of the legislative measures you have adopted or may adopt will be productive of much good.

Recent history has furnished very good evidence of the power of stringent measures adopted by governments, whether to prevent the introduction of an insect pest or to stamp it out when first introduced and before it has acquired a strong foothold. Several European nations have in this way averted, so far, the grape phylloxera, and the German Government, on one occasion at least, effectually stamped out our Colorado potato beetle, which became established in a restricted locality.

The danger which threatens orange growing districts in this State not yet affected, as well as the orange belt on the Atlantic seaboard, is great, and we cannot too earnestly appeal to the authorities that be for means to employ still greater vigilance to avert it.

Riverside.

What a relief it is to get from a scale infected region, with the attending evils of blighted and withering growth, smuttiness and unmarketable fruit, into a neighborhood yet exempt from these pests, like this enterprising locality in which you meet! What a joy in contemplating by contrast the bright and cleanly aspect of the trees! And what is there more beautiful in nature than a perfect orange grove at this season, and yet untainted by cocid or aphid, or other insect enemy? In all my travels I have nowhere felt nearer the ideal Garden of Eden than in some of your lovely valleys yet unvisited by these destroying atoms. The profusion and perfection of fruit and flowers, the Elysian character of the landscape, the genial sun, all appeal to the higher æsthetic feeling in man, and one is moved to enthusiastic contemplation and admiration of the glories of nature and the bounties of heaven under such favorable conditions.

You know better than I do how your laws have acted in the past and are acting now, and how far your State Inspector and your different County Inspectors have succeeded.

State Entomologist.

But, before passing this matter of legislation, I should be derelict in my duty if I did not urge upon you the value of one form of legislation which has not yet been tried. Without diminishing one iota the work already being done, whether by individuals or Boards, it does seem to me that if you had a State Entomologist, *i. e.*, an officer appointed to devote his entire time to this subject of economic entomology in the State, much additional good might be accomplished, provided he was properly supported and was given the means to carry on his work effectually. You should not commit the same error that has been committed by some of the Eastern States in which the cultivators of the soil have desired to have such a State Entomologist appointed. In three cases which I now have in my mind there has been quite a disposition on the part of the Legislature to pass a proper bill, but has failed in each case because of the conflicting interests which aimed to control the office. Either the State Board of Agriculture or a State Horticultural Society, or a State Agricultural College, or some State University, or some other State institution desired to have the honor and the privileges pertaining to the office, and, between them all, failure has resulted. I should like to see California with a competent State Entomologist appointed under a bill carefully drawn up providing his duties, and appointed by the Governor, upon recommendation of the Professor of Agriculture in your State University and the President of such other State horticultural and agricultural bodies as may exist. In this manner the interests of all these bodies might be considered, and the State could not, in my judgment, make a more profitable investment than in the creation of such an office.

Importation of Parasites.

It has doubtless occurred to many of you that it would be very desirable to introduce from Australia such parasites as serve to keep this fluted scale in check in its native land. We have already seen that there is one minute parasite, which has, in all probability, been brought over with it from Australia, and there is no question but that it is very desirable to introduce any such of its enemies and parasites as can be introduced. This State, yes, even this county, could well afford to appropriate a couple of thousand dollars for no other purpose than the sending of an expert to Australia to devote some months to the study of these parasites there, and to their artificial introduction here. But the agent must be an expert entomologist, and his selection should be left to some competent authority. The result for good, in the end, would be a millionfold, and I have no fear but what you, as orange growers, will appreciate the force of this statement. I would not hesitate, as United States Entomologist, to send some one there with the consent of the Commissioners of Agriculture, were the means for the purpose at my command; but unfortunately, the mere suggestion that I wanted fifteen hundred or two thousand dollars for such a purpose would be more apt to cause laughter and ridicule on the part of the average committee in Congress, than serious and earnest consideration, and the action of the last Congress has rendered any such work impossible by limiting investigation to the United States.

Let me, in closing, lay stress on the fact that I have, in all that has been said relating to remedies, had reference solely to the orange and the scale insects affecting it.

The fluted scale is undoubtedly the most difficult to master, and the means I have recommended against it apply equally to your other orange scales, as experiment has already demonstrated. Your red scale—in some respects even worse than the *Icerya*, and of which I should like to say something in detail did time permit—succumbs to it. But when it comes to the treatment of deciduous trees, much that I have said will not apply, and each tree needs separate consideration and is affected differently by different washes.

Prosperity vs. Insect Pests.

In passing from place to place since I have been in the State, and more particularly in visiting the different parts of Los Angeles County, I have been struck with the wonderful activity everywhere manifest in real estate. Land is "booming" in all parts of the country; but nowhere has it reached such proportions, it seems to me, as right here in this part of California. There does not, at first, seem to be much connection between the real estate boom and the scale insects of the orange. But I am quite sure that the rapidity with which your orange orchards have been and are being converted into town blocks and town lots has a marked influence on the spread and increase of these scale insects; for no sooner does the owner of a grove subdivide and sell it than the different new owners allow it to "run to grass," so to speak; and for miles around all your thriving and growing centers of population may be found neglected orchards, upon which the insects are reveling and multiplying and scattering into those which are more carefully cultivated. To this cause is, in my judgment, due very much of the rapid reinfesting of these cultivated orchards, so that your insect troubles are, in a measure, connected with your unprecedented growth and prosperity.

Not an Unmixed Evil.

Finally, let me say before taking my seat, that your scale insects are not an unmixed evil. With your lovely climate, rich and varied soil, and the many other advantages which your beautiful country possesses for the cultivation of the orange and all other fruits, the business would soon come to be overdone and rendered unprofitable, could every one, before planting his trees, feel sure of an abundant and fair crop without having to contend with difficulties. Under these circumstances, it seems to me that even the dreaded scale insects, by driving the thriftless to the wall, and giving the careful and intelligent man who persists in destroying and defeating them, better prices for his product, may, after all, prove a blessing in disguise. One thing is sure—it is pure folly to talk of giving up the battle, and abandoning the field to these your tiny foes. It used to be said that Sebastopol was impregnable, but the allied armies of England, France, and Turkey succeeded in capturing it. There is no insect that is invulnerable, or that we may not overcome, if we but attack it at the right time, in the right place, and with proper means and ability. You will, ere long, feel yourselves masters of the situation; and if what I have said will aid in ever so little to give you the victory, I shall feel abundantly rewarded. I have already occupied more of your time than I intended to, and though much is left unsaid, even about this single insect, I must close in order to leave time for discussion. In doing so, permit me to congratulate you as a Board for the good work already done, and to prophesy that in future years, when the fair and unrivaled fruits of this coast shall have multiplied beyond the most sanguine vision of any of us, and have found its way in one form or another to consumers in all parts of the world, the people of California will gratefully remember the work you instigated, and the battles you fought. Ladies and gentlemen, I thank you.

Mr. W. G. Klee, State Inspector of Fruit Pests, was then introduced by the President, and addressed the convention as follows: Mr. President, ladies, and gentlemen, I ought really to excuse myself, because I have really no essay to offer. The subject upon which I was asked to speak, or to prepare an essay, has been gone over so many times, and was discussed by me quite so fully, or as fully as I knew, at our last convention in Sacramento, that I can now add but little information which may be of value. The subject which was allotted to me for discussion was that of the codlin moth. The codlin moth is an insect which has not been known to a very great extent in the southern part of California, but it is altogether too well known in other parts of the State. I might say, for the information of those who are not acquainted with it, and I judge there are a great many present who are not, that it is a small moth belonging to the *Tortricideæ*, and its habit, of which you have heard, is that of infesting the pear, apple, and quince. It is not altogether confined to those fruits, for it will, so to speak, by accident, get into the plum and peach. But the apple, pear, and quince are the food plants of this moth. Like all other insects of this nature, it has been brought from a foreign country—at least there does not seem to be anything to disprove this as yet. The moth appears quite early in the season, about the time the flowers are ready to fall. It lays its eggs in the blossom end of the fruit. It develops rapidly, and when reaching its maturity, which generally takes the full sized larva about twenty-one days in the apple, it escapes and lets itself down to the ground in the shape of a small larva. This is, in short, the history of the moth. This habit gives us an idea of how to battle with this insect.

There are two modes of fighting them which present themselves to us. One is to prevent the hatching of the egg, or the killing of the young worm while working into the end of the fruit; the other is catching the larva in traps as it is escaping from the fruit and lets itself down to the ground. Until very lately the last remedy, that of catching the larva after it had already done a great deal of damage, was the one that was relied upon.

Later developments and investigations, in the Eastern States especially, have proved to my mind that they have reached the best results by treating the fruit in such a manner that it became poisoned for a length of time, thereby killing the larva. The materials used for this purpose in the East, and in this State, have been the arsenical compounds, which are arsenious acid, Paris green, and London purple. These three substances vary somewhat in their action. The arsenious acid, or white arsenic, is perfectly soluble in water. It is an acid, as I stated, and has the effect, in most cases, of damaging the foliage. I have not, so far, except in a few instances, been able to apply it so that it did not damage the foliage, and consequently the fruit. The other two substances are compounds of arsenic, Paris green being a compound of arsenic and copper. Both of these have been used with quite good success in the East, especially in the latest investigations of Professor Forbes, the State Entomologist of Illinois, who, for two years, has conducted some careful experiments (and which were not in my hands at the last convention), which have fixed in my mind the belief that in those we shall have the remedies for this insect, at least in certain regions. I will explain why I say "in certain regions." I will speak first about Paris green. As I stated, it is a compound of arsenic and copper. Its peculiarity is that it is not readily soluble. It has been generally believed that it was not soluble in water, but some quite interesting experiments at the University, by Professor Hilgard, have proved that it is soluble, and we thus have the explanation whereby in course of time the poison becomes innocuous. This investigation is still going on, and I cannot say exactly how it stands, or in what proportions it is soluble, but it will be proven that the Paris green will eventually be dissolved when placed upon the fruit. This has quite an important bearing in this

State. It was generally argued that Paris green, used in this State, with our absence of rain, would be a very dangerous remedy to use, as there would be no chance whatever for it to be dissolved or removed. As it now seems that it is soluble, no doubt our heavy dews in many places, especially in the coast counties, which prevail in the best apple regions, as, for instance, in Sonoma, Napa, and Santa Cruz Counties, will be perfectly sufficient to remove the Paris green. It is a question whether it will work in our drier valleys, especially in the foothills, where there is a thorough absence of moisture, and that is something that remains to be proved. It has been argued by its advocates in the Eastern States that the growth of the apple and pear caused the arsenic, so to speak, to be thrown off, as the compound was only applied when the fruit was quite young. This may be so, and we hope that it may prove so, but I now see the reason why it has been proved that no arsenic could be found after some time had elapsed after it had been upon the apple. It is clear that it has been removed by the moisture.

Now, as regards the manner of application of these remedies: The Paris green, although slowly or gradually soluble, is not soluble at once in any liquid which we can use with any success. It has to be mixed with water. That is the only way that we can use it, or perhaps with a thin soap solution. In that manner, the compound sent through a very fine spray is spread all over the tree, all over the blossoms, and the smallest drop of this liquid is sufficient to poison the fruit to such an extent, that either the egg (I cannot say for certain whether the egg dies), or the young larva is killed. This may have to be repeated two or three times (we hope that twice will be enough), but while that is a matter of experiment in this State, the Paris green has been proved to be the best remedy by some.

London purple has proved equally so with others, but still the data in this State are not exact enough to enable us to say with certainty which is the best. I am conducting some experiments on this point, and by the end of this season I think I will be able to tell with certainty which of the two remedies or compounds is the better; and whether, in any locality, there is any danger if the compounds are used. I have issued a bulletin on this subject, and that is the reason why I have not taken the pains to write any essay at this time. This bulletin is here for distribution to any one who wishes to get it, and really all that I have said is in it in regard to the manner of application. In my recent experiments with it, I found considerable difficulty in applying the two substances, principally on account of the nozzle.

The Cyclone nozzle, to which Professor Riley has referred, secured excellent results in every respect when used with a liquid that can be strained and be perfectly soluble, but with a compound like Paris green or London purple, where the particles are suspended in the water, it is almost impossible to prevent some clogging. The nozzle that I adopted is something like a stop-cock, or can be used like one, which, by a simple turn allows it to flow in a stream whenever clogging is noticed, and by again turning, the fluid can be let out in a very fine spray. In using it when you want to clear the nozzle, you simply turn it aside from the tree. I think it is very important, because in using the nozzle at one time it would become clogged, and at another time it would come very fine, and again too thick, and therein might lie some danger in getting the Paris green on the fruit. While I think there would not come any harm from its use, yet probably the right way is to wait until we have our fruit analyzed this year (and I ask everybody who intends, or is going to try this, to send samples of fruit which we hope to get analyzed), thereby settling definitely whether there is the slightest danger in its limited application.

It is of the greatest importance to remember that the arsenites must be used in moderation. Those people who have lived in the Western States, and have used the Paris green on the potato bug, understand the necessity of precaution in the handling of it. Everybody who handles it should take extra precaution, but I think, if done in the manner in which it should be, and sprayed only in the proper proportions, there will not be any danger connected with it. The amount that is forced on each fruit is so infinitesimal, that it will not amount to anything after some time has elapsed. Now as regards the time of application. As I said before, the moth lays its egg in the blossom of the apple. It does that in the early part of the season, but it has been found that later on it sometimes and to some extent may lay its egg on other parts of the fruit. In such cases, where the insect has increased very much, we may not be able to save the amount of fruit that we expect for that season, for this reason: It is with this remedy as with everything else in the insect line, that only by thorough coöperation we shall be able to accomplish our purpose. For instance, I may have an orchard which I treat right, but my neighbor does not do anything. I might, by my thorough work, have killed every moth on my trees, but if my neighbor has not done the same thing, his pests will come to my trees, and after the action of this poison has passed away, and the time for application has passed, then of course the remedy cannot be so effectual as if the place were completely isolated. I think this will be found a very excellent remedy, and that after a thorough trial it will prove perfectly harmless; and that the adoption of it throughout the fruit sections will drive the enemy to the wall. If so, it is bound to reduce them so materially, that the harm which they may do will be found to be very little.

I had hoped to have received an analysis of the different compounds of both Paris green and London purple, but through some delay it has not arrived. It is clear that the strength of these compounds will depend in a great measure upon the strength of the brands sold, and that will have to regulate its use. It has been found that some brands of the Paris green contain 40 per cent of arsenic, while some brands do not probably contain more than 10. The result of our analyses will be concluded in a few days. I was promised them here to-day, and they will probably come in time for the bulletin for publication, which will be sent out after this former bulletin.

When the Paris green becomes a settled remedy for the codlin moth, its price, no doubt, will be changed very materially. At present it is quite expensive, and the dealers have been quick to take advantage since the passage of the interstate commerce bill, and to raise the price about 50 per cent; but the compound is so easily obtained, and so easily manufactured, that if there is any demand for it, or should any demand arise, we will be able to obtain it at a moderate cost. The cost will never be any preventive to using it very liberally.

I think that I have said all that I have been called upon to state, outside of what I said at Sacramento, but I trust you will discuss the matter more fully, and bring out any other points which I may have neglected to express.

Mr. Block: I would like to hear from Professor Riley upon this subject. It is a very important subject to some of us and we would like to have his opinion. If he cannot give it in writing, we should be very glad to hear it. I understand that it is a matter which he has studied greatly.

Professor Riley: Mr. President, I have very little to add to what Mr. Klee has said to you. I have used the arsenites against the codlin moth in the East, and it has been used there to a great extent, and its use is of long standing. During the last ten years it has come more and more into use, and if the verdict of popular and increasing usage can be depended upon, then we have it that its use has been most effective and the most satisfactory to prevent the ravages of this insect. An experiment carried on by Professor Forbes on a small scale is a repetition of what has been done on a larger scale for years in the field. Some ten years ago a gentleman in Illinois first used Paris green against the codlin moth successfully. Probably he is the man who has used the arsenites more than any other man and on a larger scale. The gentleman is Mr. A. R. Whitney, of Franklin Grove, Illinois. You have all heard of his crabapple cider. He has an immense orchard and has had a very large experience, and from it has settled down to the conviction that there is nothing so excellent as the London purple. The Paris green is, of course, not soluble in one sense of the word. Chemically, we say it is not. The fact that a certain preparation of it is soluble, at least in a mechanical sense, is well known. The solubility is only a question of fineness, and in this respect the London purple in comparison with Paris green is much more soluble. We know it as the refuse of aniline dyes which is so mixed with a certain preparation of charcoal, that its effect is very beneficial if we succeed in getting it pure. Like Paris green we have it in a great many diluted forms in the market. Without proper means for using this violent preparation in apple groves (as these substances are very poisonous), I would advise those who have not had the benefit of my friend's experience of Franklin Grove, to confine themselves to the London purple. It is much cheaper and its solubility is such that it can be reduced to the finest particles.

Now, in reference to the applicability of my Cyclone nozzle to the use of the Paris green. It struck me that the arrangement of my friend, Mr. Klee, was rather clumsy, and he is entirely mistaken in reference to its clogging. No amount of clogs will clog it. It will fill up and yet not clog. Even where the particles are larger than the opening itself, they will be whirled round and round by the cyclonic action so rapidly that they will eventually be forced out. Of course it will clog if you have large substances that are larger than the capacity of the orifice. For that reason I would never think of using that or any other nozzle when you want to spray with any of these arsenites or any other powder used in water without straining. I would always have a straining wire cloth, the meshes of which should be graded according to the orifice, and then there is nothing more easily controlled. The cap screws off and the whole matter can be thereby controlled, and if one of the nozzles fills up all that is needed is to unscrew it, throw out the clogging matter, and put the cap on again.

I think that the disadvantage that he mentioned in regard to the clogging of this nozzle is rather exaggerated.

There is nothing else that I need to speak of except the danger. I have been slow to urge or recommend the use of these arsenites for this particular purpose on deciduous trees, because of the possible danger. Experience has changed my opinion in that respect. In the beginning of the use of this Paris green against the codlin moth some ten years ago, I took the ground that I was rather unwilling to advocate its use upon our tables and in our cooking. The secret of the use of this remedy is the small quantity which is caught in the calyx end of the fruit, the end which the moth chooses for the laying of its egg. The young larva penetrating the skin and taking a small quantity of the poison is thus killed, but there is some danger of a portion of the poison lurking in the end of the fruit, but as I have said the result of the large experience in the East, has convinced me that the danger is so slight that it can hardly be considered. For this reason I should not hesitate to use a little of the arsenious preparation, as I have recommended, upon the fruit which is not gathered until after you have had your rainy season, or upon the orange, the rind of which you seldom or never swallow.

Mr. Block: I would like to ask the proportions of the compound and how it is dissolved. I used London purple last year. I dissolved it in water. I found by applying it on apples that the skin of the apple repelled it; I could not cover them with it. I then made a mixture with some soap, and found that the apple would hold the soap so that I could cover them entirely. I found that quite beneficial for the purpose of holding the mixture and distributing it. I would like to know if Professor Riley has any method to give as to dissolving the Paris green, which is any better than we have. I would also like to know the proportions in which it is used.

Professor Riley: I have not read Mr. Klee's bulletin, but I presume he gives the preparation which we have used in the East. In using Paris green we usually employ about one pound to fifty or sixty gallons of the liquid. In using London purple one half a pound to the same amount will answer, because it is a lighter material and will fill a much larger area. My experience with the two leads me to prefer the London purple, but of course you must get the genuine article. It is brought over in large quantities by a firm in New York. I do not know who is the agent in San Francisco. The Paris green is less soluble, and for that reason I presume would necessitate some mechanical arrangement in a tank, in which to have the liquid. The arrangement described in one of my reports is simply a double acting pump, which, in every movement backwards and forwards, moves a little stirrer, which can be inserted in the tank, or barrel, and taken out again. I think that is a simple method of getting at it. I know of no way in which it can be perfectly dissolved. Perhaps some such device as Mr. Klee suggests might be made. The difficulty with the arsenic is, as he says, the burning of the foliage, unless it can be used in such dilution, by uniting with the other substances, as not to injure the trees.

Mr. Klee: I would state, in answer to Mr. Block, that I have given proportions in my bulletin, which I expected to have here to-day. I have recommended a pound, to fifty-five gallons of water, of Paris green, and the same of London purple.*

Professor Riley: Permit me to say that in this matter, just as in the washes for scale insects, the secret of successfully spraying trees lies in spraying them with a fine mist, so that you do not have a running liquid, or a loss of material, and anything that will give adhesiveness to these arsenical diluents will increase their value. In the East a syrup emulsion has been used, and a little flour has been added for that purpose. Flour is an excellent addition. It increases the insecticide quality of the poison, and nothing will put these fluids on a smooth apple, and make it adhere more certainly, than the little nozzle that I have mention. If you can show me any form of nozzle that will do the work any better, I shall be very glad to urge it instead of this. It is admirably adapted to this purpose.

Mr. Klee: I thought I made quite a thorough trial of the nozzle for the purpose, and I have always used it for all other purposes where I could get my liquid in a soluble state. I may not have been able to get the Paris green in the condition in which it ought to have been.

Professor Riley: Why not strain it? I always strain it.

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*This proportion proved too high. See bulletin on the last pages of report.

Mr. Klee: I thought in this case that it would be very hard to strain it. I did not think I could get it fine enough to go through the nozzle by straining it, or rather, I would have had to use too coarse a strainer to get it in condition. My nozzle may have been imperfect, but the other nozzle is perfect as far as it goes. It is patented in San Francisco, and gives a very fine spray in the very best form, and uses the liquid economically.

Mr. Block: Mr. President, probably I owe an apology here. I do not depreciate the value of Mr. Klee's services, but since Professor Riley remains with us so short a time, I am very anxious to get all the light we can from him, so that we can have the information published for the benefit of those who have been unable to attend. That was my object in asking these questions. Now in the Professor's statement to us here, he said that he did not recommend the same washes for all kinds of trees or for different fruits. We ought to have that information.

Professor Riley: I want to assure you that I have no objection whatever to answering questions, but there are others here who may be able to answer better on some points than I can. In this matter, you ask me rather a puzzling question. I think I could rather learn from you than to teach you how kerosene emulsions will act upon different trees; for the few experiments I have made, although made with care, have not covered a sufficient period upon which to base an opinion. For this reason I would hardly attempt to answer. A number of experiments have been made in the East, sufficient to show that there are scarcely any two kinds of plants affected alike. You will find in one of the bulletins which I have published quite a lengthy list of such plants. I have been astonished at the power of resistance in some, and the ease with which others are injured. Your President has told me of his experiments as to the power of the kerosene emulsions upon the olive. It is one of those trees which it seems from experience, will resist the strongest oil without injury. When you apply these emulsions to the apple, pear, apricot, etc., you will find a variation. You will find a variation in the different varieties of the apple. All that can be said is to state the general rule and not go into detail. We hope to get at an early date, at least two special agents in the department, to be sent to your own State, who will work out these questions in detail, and be able to give you the information.

Mr. Lelong: I would like to ask Professor Riley whether he considers the red scale of the Santa Ana Valley, the same as the scale found in the San Gabriel Valley? I would like to state, at the same time, that we have had two insects to contend with, in the shape of the red scale. One in the San Gabriel Valley, and one in the Santa Ana Valley. In the Santa Ana Valley, the trees or limbs began to die. In the San Gabriel Valley the trees turned yellow. Some five or six years ago, I took some specimens and sent East to Professor Comstock. The specimens were dried, and he was unable to find out whether they were different. Afterwards, when Mr. Cooke, then the Horticultural Officer, was in Los Angeles, I called his attention to it, and he thought they were the same. About three years ago I began some experiments on the red scale in the San Gabriel Valley, and found that the scale had attacked only the leaves and the fruit, while the one at Orange had attacked leaves, wood, and fruit; the limbs would die back, because they were infected with the scale. No limbs die back in San Gabriel, for no scale has been found on them, and therefore, we concluded that it was different, because its habits were so different. It was also different in appearance.

Mr. Block: Have they tried to exterminate them in either of those valleys?

Mr. Lelong: Yes, sir; they have tried everything in vogue. I was connected with the Fruit Growers' Association in the San Gabriel Valley. We tried many methods of exterminating them. We cut down trees. We sprayed them with all kinds of washes, and have since been using this mixture [reading]:

INGREDIENTS FOR ONE BARREL OF FIFTY GALLONS.

Potash	14 pounds.
Caustic soda, 98 per cent	8 pounds.
Lime, unslacked	5 pounds.
Fish oil, Polar or Seal	10 gallons.

First, dissolve the soda and potash by placing them together in twelve gallons of water; second, slack the lime in the barrel to be used, in two gallons of water; then add the fish oil to the lime, and stir well until the lime and the oil have turned to a thick butter; then add the soda and potash, with water boiling hot, and stir well with a dasher for five minutes or more; then leave standing four or six hours. At the end of four or six hours fill up with cold water. Do not pour in all the water at once, but about two buckets at a time. Stir well as the first two buckets go in, to prevent lumps. Use the following day. Apply cold, one pound to the gallon of water. In dissolving it do not boil, but weigh the amount to be used; place in a barrel, and on top of it pour hot water, about one bucket to every hundred pounds. After pouring in the hot water stir lively with a dasher until it is entirely dissolved; then reduce with cold water sufficiently thin to pass through the strainer; then place in the tank, and fill up with water; stir well, and it is ready for use.

The combination of the ingredients becomes one of the best fertilizers known. Through the summer, when the trees are growing, their pores are open; and as the tree has to take up considerable of the solution sprayed upon it, and as the application has to be repeated, unless it be a fertilizer the tree becomes diseased, on account of taking up of minerals, acids, etc., which impair the health and growth of the tree.

In many orchards, where the fruit was badly infected with red scale, and the fruit, by its presence, showed a rough appearance last summer, it is now marketable and clean, and the trees healthy and vigorous.

Mr. Wilcox: I would like to find out whether my idea is correct about the cottony cushion scale. I have found a few trees in San José and a few in Santa Clara, where we have a very few of the pests. In Santa Clara they appeared on the acacia, on trees formerly said to have been imported from Australia. We had them all taken up and destroyed, but a year or two later they appeared again in a northwesterly direction, on the common locust, and I believe they cut them down. They still continue to spread but not very rapidly. A year or two after that I found them extending in the same direction on the black walnut tree. They were coming in the direction towards my place two miles away. I am a little curious to know whether they will reach it. San Mateo was the first location of the scale. Those acacias came directly from Australia.

Mr. Riley: You mean that they were imported from that place?

Mr. Wilcox: Yes, sir; I mean to say that they were imported.

Professor Riley: In reference to this question, which was asked by Mr. Lelong, I think from what I have heard that there is a difference between the two forms of the so called red scale in the San Gabriel Valley and that around Los Angeles. In fact, in Los Angeles I have found two forms. Mr. Coquillett has given this matter considerable attention, and yet, I am not prepared to say, from the attention I have been able to give it since I have been here, whether there is any specific difference between them. I have a great deal of faith in the care with which Professor Comstock originally conducted his experiments, and he came to the conclusion that the difference was only one of variety. I will say that there is no doubt that these pests were introduced from Australia, and that probably the different conditions are the result of different climates. We have here in the same county two species, showing different effects, of the same habits, one of which confines its larvæ to the foliage, and the other acts more injuriously to the tree, though we find intermediate forms. I do not think they are the same species, but until a more careful study I should not depart from the opinion of Professor Comstock. Two species may be very similar and yet be different. They may occur on the same tree, and be totally different in structure, and yet be of the same family. The only way in which it can be determined is by a careful study of the structure.

A Gentleman: Although not a member of the convention, I would like to ask in regard to the scale remedy that a neighbor of mine has used on the black scale. He used a kerosene emulsion on his trees and killed a great many of them. He saw a little remedy in a paper, to take one pound of quicksilver and three pounds of lard, and make an ointment, and put it around the tree on a strip of cloth. Mr. Colby used this remedy with great success. All the black scale was killed. I would like to ask the Professor his opinion as to how it would act on the red scale, or the white scale, and whether it would be injurious to the tree? The trees that he used it on colored the bark but the tree was all right. Mr. Colby's orchard is in a ravine where the winds do not touch it, and it could not have been that any change in the weather killed the insect instead of the quicksilver.

Professor Riley: I have no experience which would justify me in answering the question, but I should be inclined to answer it that it was probably killed by a change in the weather. It is extremely doubtful whether anything placed around the trunk of a tree would affect the insect upon the tree, and I should be more inclined to think that the black scale disappeared from natural causes than to labor under the supposition that the quicksilver killed it. I know of quite a number of parasites which affect this black scale, and it is those parasites which keep it down, and keep it comparatively in check, and make it a much less pest than the red, which are not known to have so many parasites, or scarcely any. Where there are parasites we frequently have this spectacle. The scale increases up to a certain point, and then its natural enemies get the upper hand and get control of it and it drops from the tree dead. I think something of the kind may have been the case in this instance. So often has this been the case that I have doubted the value of spraying to destroy the scale where I knew the parasites were at work. If I knew positively that they were at work I would not do so, because in spraying I would kill the parasite, which might be doing the work very well.

Mr. James Boyd: It may be of interest to some to know what the effects of the scale are in its native country. In many countries an insect has not the same vigor that it has in the country where it originated. I know that this is the case, because I have lived in New Zealand a good many years, and all the old orchards there are comparatively ruined. A friend of mine in New South Wales, who is connected with one of the largest vineyards there, writes me occasionally that they can raise fine crops, and get good prices for them, but spoils the whole of his recommendations by saying, "If they could only get rid of the various scale insects."

Mr. Klee: There is one thing in connection with this black scale that it seems to me is of great interest. It is evidently kept down and wiped out in various parts of the State. Now, precisely whether that is due to some insect enemy, or to the condition of the atmosphere, I am not sure. I noticed a very peculiar case right at Berkeley. Five years ago I knew of two pretty good sized olive trees, which grew in a rather shady location and had traces of the black scale. To-day they are cleaner of it than before.

I see no increase on them. At the same time there are young trees, exposed to the sun and to the air, where they seemed to be more increasing. I cannot explain it, except that there must be a parasite, which is very prevalent there. In this connection I would say, that about ten years ago the bay trees were bright and clean. To-day there is hardly a tree that is not covered from top to bottom, and the scales are evidently increasing, and yet ten years ago they were swept out. With all native insects there are conditions which govern them so that their increase is kept back to a great extent. I have not referred to those further than to describe how they looked, because it will appear in the much delayed report, which should have been here.

Dr. Kimball: Mr. Klee's experience with the black scale is my own. I have seen twice in twenty-one years localities in Alameda County, on the Bay of San Francisco, perfectly infested, to such an extent that the foliage on the large willow has been three quarters destroyed, presenting a sorry yellow aspect. Then it faded gradually away and has not been noticed during the last fifteen years, until up to a few years ago, and now it is becoming prevalent again in some parts of the county, and there is scarcely a laurel or an evergreen tree that is not infested with it. It includes not only the laurel, but the willow, the orange, the whole citrus family, as well as the oleander and every tree of that variety. I place my greatest dependence on the destruction of these insect pests which are now so prevalent throughout California, which seem to be now extending, to the influence that will probably and ultimately be exerted upon them by these parasites, and I look forward with great impatience for experiments being made for the importation from foreign countries whence these insects came, where they have accumulated and disseminated, and I believe that we can have the variety of parasites placed here in California, which will be our greatest dependence in saving us from these insect pests. It seems to me, as far as my observation has extended, that whenever the growth of anything has preponderated to any great extent, there is always some provision of nature for destroying it, and I believe that a parasite will be found in the country from which this scale came which is intended by nature to keep it in check.

Mr. Blanchard: I would like to ask if any information can be given here in regard to a paste for killing scale. The "California Rural," some time ago, published a method of killing them by the use of a simple paste; it was simple and harmless. If any one has tried the remedy, I would like to know the result.

Professor Riley: I would answer the last question by saying that almost anything that would form a paste would, after drying, be apt to kill off many of the small scale insects, but as to the larger scales, I should very much doubt it, because of its size. The paste must necessarily be very thick to bring off the larger scale bodily, and then it would not destroy the mass, which is protected by a heavy coating, and would be likely to hatch again. The beneficial effect of flour in any of these washes is well known in the East. It is recommended as one of the sticky substances, and might be added to any of these washes. I doubt very much whether it would be a good remedy alone for the white scale. It might be a good remedy for the red scale.

Here the convention adjourned till the afternoon.

AFTERNOON SESSION.

MR. LELONG: Mr. President, I want to say a few words in regard to proper solutions to be sprayed upon orange trees. We have tried all kinds of remedies, and we find that where corrosive solutions have been used, the trees suffered considerable; in many instances they shed off the foliage and fruit, and when a tree loses its foliage, the sap will go down to the roots, and die back is sure to follow. Also, where sticky materials were used, the gummy substance stuck to the leaves and fruit, which in a few days dropped, and what fruit, if any, remained on the tree, would be of a pale color as if not matured. Many of the corrosives used would damage the tree, although they would not kill the insects. We have found that whatever is sprayed on a tree, it must be a fertilizer to the tree and fruit. We have also found that trees can be killed by successive spraying. We have also found that from the effects of spraying, the pores had closed and the bark had become tight on the tree, and such trees would become stunted, and the fruit thereafter would be very small.

So often have the fruit growers had to repeat spraying that they have become discouraged, for it is impossible to reach every part of the tree with any remedy by spraying. Fumigation has an advantage over spraying, the gas is kept confined long enough to allow it to reach every part of the tree, which it is capable of doing in ten or fifteen minutes. The gas used is very poisonous, but as it is generated in the tent, it is safe to handle, and it being volatile, it escapes into the air the moment the tent is removed. It is so volatile that if any injury is done to the tree, it must do it while it is confined, for nothing will remain on the tree after the tent is removed. Of all the trees upon which I have experimented (and they are many) with chemical gases, the ones injured showed the effects the same day the gas was applied. In about two weeks after the trees commenced to grow, and in a month or so no one could tell that they had ever been treated. Therefore I cannot see how the injury, if any, would be noticed one year after. I have every reason to believe that fumigation will be the coming remedy. Mr. J. W. Wolfskill, and Alexander Craw, of Los Angeles, were the first who gave this gas a thought, and for more than a year they have carried on these experiments. At that time no one believed that the gas would ever accomplish what these gentlemen have demonstrated it has. Mr. Coquillett became associated with them, and I hope that they will succeed in perfecting this gas remedy, which will be of such great value to the fruit growers of this State. The apparatus which we have used, consists of a large square frame, resting on four uprights; these uprights rest on six small size iron wheels, such as used on the Titus ladder; there are three wheels on each side, two in front, and one in the rear, on each side. At the top is a ring made of three-quarter inch gas pipe, and from this ring the hood is suspended, and by means of guy ropes it is let down over the tree and furled up at will; the hood having been furled up on the ring at the top, can pass over the tree to the next one. The whole outfit is light, and only two men are required to move it about the orchard. It is the invention of Captain Dobbins, and there is no patent on it. Mr. L. H. Titus invented another of a similar plan; it has a large roller at the top by which the tent or hood is rolled up, instead of being pulled up by ropes. I would like to hear from Dr. Chubb, of Orange, who is here among us to-day.

DR. CHUBB: Gentlemen, I just came in in hopes that I would hear the essay of this morning; and I would much prefer to listen to criticisms and discussions upon that subject, because I am to-day just as earnest a student, and just as anxious to learn, as I was when at a previous meeting at Los Angeles, when I was rather new at the business; but I am convinced from the experience we have had since then that the only effective method to use in our fight against these insects is to secure a remedy that is harmless to the tree, and then use it repeatedly. In our past experience all the remedies used have been more or less unnecessarily expensive, because they were really experiments in preparation.

Whenever anything new is brought forward everybody is anxious to try it, and before they have had time to thoroughly try it another comes up, and so no remedy has been thoroughly tried. Some of these remedies have not had more than one application in a season; but it is evident from the experience we have had in the Santa Ana Valley, where we have had a very bad visitation of the red scale, that we must direct our efforts to the young insects, provided we have a remedy that is harmless to the tree, and is a fertilizer to the tree, for of course you can never go amiss in finding fertilizers, as far as any application can be made which will benefit the trees. Any remedy that has been tried and left without repetition for two or three months or more has seemed to be a failure, because the orchards where the remedy has been most frequently applied have been contiguous to other orchards where the pests were spreading. These insects are spread through the means of birds and bees; and it has always been admitted on all hands that a universal application of any remedy is necessary to a thorough experiment on any of these pests. Some of the remedies used, as Mr. Lelong has stated, are deleterious to the tree. I believe that some of our orchards in the Santa Ana Valley have been very materially injured by the application of too strong remedies, with the idea that they would kill the insects, whether or not it hazarded the trees. Of course, if it injures the trees, that is a greater loss than the loss of any one crop, for the orchard ought to be making a steady progress from year to year. What we have concluded is, that if we can get a simple remedy—a remedy that will be harmless—that can be used repeatedly, not only twice or three or four times during the season, on the old and young insects, but during the time that they are hatching continually, without trenching upon the effective growth of the tree, we will adopt it. But, to my knowledge, there has never been an instance in the valley where any application has been made frequently enough to prevent the young insects from maturing and attaching themselves so thoroughly to the bark that it is almost impossible to detach them by a single application.

Again, it is a very difficult matter to apply a remedy in the way of a spray to reach every portion of the tree. There will be curled leaves, and leaves that will move so easily by the force of the spray, that a portion will be protected from being wet. That can be, and I believe will be remedied by a more thorough apparatus, which will fill the top of the tree with a spray so fine that it is like a fog. We should cover, and dampen, and moisten every portion of every leaf in the application of sprays. My idea is carried out to a certain extent in the apparatus that has been arranged for the application of gases. Not exactly a closed tent, but a tent to a height covering the top of the tree and coming down to the lower portion of the limbs, so that when it is thrown up to the center of the tree it will be retained. There is more or less of the spray wasted by the winds, and it is a waste of time to work at it only a few hours in a morning. We should be able to commence in an orchard and work right along through the day, unless it is extremely windy, so that it is impossible to reach the top of the tree without a waste of too much material. I think that any wash should be made of so fine a material that it can be thrown into the top of the tree, so as to completely envelop it, and that it adds very much to the effectiveness. I have great hopes of success with this new gas process, because the principle is correct. If we can confine the gas so that it cannot escape without injuring the foliage, or the blossoms, and at the same time get rid of this pest, even if it is more expensive than our sprays, it will be cheaper in the outcome, because in that case when we have once gone over our trees we will be sure that all are dead, and we may secure a universal application of any infested district.

Of course these various soaps and emulsions of various kinds that we have been using here are liable to be abused, for the reason that people generally think that they can make up their own soaps and that they can only bear the expense by so doing. By cheapening the process and making their own remedies without some one who has had practical instruction in it, the results have been found to vary very much. It is impossible to take a green workman, a green orchardist, who has never had experience, and get him to apply any preparation as the inventor would have applied it, or as it ought to be applied. For that reason it is not to be wondered at that there are very many failures in the application of remedies. If we could persuade the people of a district to take a remedy that has been proved to be death to the insect without injuring the tree, and if it can be so cheapened and applied that men think they can afford to use it three or four times during the season, I believe that course will have to be adopted. I believe, also, that the expense of the application of such remedies will have to be systematized, and that we will by and by come down to the principle of employing men with apparatus, with knowledge and experience, who can not only manufacture the remedies, but can give them the most intelligent application—when men will adopt it as a business, just as they take our oranges on the trees and make a business of boxing them and shipping them to the eastern markets. It is systematic, thorough work that we need, because we have proved, time and again, that the application of remedies at the right time has killed the insect without damaging the tree. I believe if we could carry out a systematic effort we could thoroughly exterminate these pests, or at least keep them so far in check as still to make it a profitable business to grow orchards of fruit.

Mr. Klee: The last speaker has touched upon a great many questions, and I quite agree with him, that the best point that can be made is a good application. We fail, and it is plain that that is where we do fail in killing insects, in that we do not reach the insect. I am satisfied that this is the chief trouble. There is one thing connected with the insect that Mr. Block has referred to. The majority hatches about the time the cherries begin to turn. But there are always stragglers left behind, and that is one of the reasons why we do not get all the insects, even if we do make a thorough application. I refer to the San José scale, so called, the little black scale which we have illustrated here [pointing to a plate]. It affects deciduous trees, and I understand has spread a great deal throughout the southern counties. As regards the use of remedies in the summer, I believe it is easier, even with remedies for the orange tree, than it is for the scale that infests deciduous trees. The orange tree will stand more than the deciduous tree in the spring. The leaves of these latter are large and tender. I have damaged deciduous trees, apples, plums, and pears, with remedies which would not hurt the orange. Generally, I do not believe that it is safe to use any of the caustics, but very little, in summer. I believe that a good soap, well made, with a slight addition of caustic potash, about one pound to sixty gallons of material, is about as much as should be used. I have used sulphur; that is not a very good insecticide. Sulphate of soda, which is formed by boiling the soda, potash, and lye together, is better. It has a tendency to remove the black smut which invariably follows the presence of certain scale, and that is one reason why I adhered to using it. There is a point where you find everybody differs—soap. The soaps which you find manufactured in various parts of the State all differ. The soaps which I have advocated only contain a small amount of water. It does not pay a man to buy water and ship it five hundred miles when he can get the same condition by buying soap that contains 75 per cent of its matter without water. Soap has been largely sold containing 75 per cent of its bulk of water. Take soap that is concentrated, if you have to buy. Soap, containing 80 per cent of substance and only 20 per cent of water, and only use one pound, as I have recommended in my bulletin, and you will find good results from one application—putting the one pound to five gallons of water. There are a great many remedies all over the State, and it is astonishing how people will differ in their opinion about the same thing. You may travel in one district, and find that they think this is the remedy; you may go into the next ten miles and find those who condemn it. It is due in some measure to the different degrees of strength of these soaps. A great deal is also due to the manner of application, and the nearer we get to perfection in that, the better the results will be.

As regards the gas treatment—in that, of course, is the great point of application, and the trouble is, that if the gas will kill the insect it may kill the tree or the fruit. Still, there is no question in my mind that the gas is the proper treatment, provided we can find something that is not harmful to the tree. I am in hopes that they have found it; but I shall wait before giving my judgment on it, until I have thoroughly examined the gases. We are too often hasty in our judgments. I know that five years ago a certain thing was pronounced a success, that was recommended by several gentlemen here in California—bisulphide of carbon. They tried it, and that was the last we heard of it. Evidently, it killed largely, and generally killed all mature insects, but no eggs. In this connection, I will say that too often people wait for something better without using the remedies which they have, meanwhile allowing the insect pests to spread.

One man will say: "This costs a little too much; I will wait." Meantime his orchard becomes infested. If you have something pretty good, use it. Do the best you can with the conveniences which you have, and afterwards, when we see something better, we can try that; but don't wait for a perfect remedy to destroy insects—do it as well as you can with what you have got. Some hope that while they are hesitating the pest will pass off. Do not listen to that argument. Do not flatter yourselves here in Riverside that you have a constant preventive in your climate. It is not so. You may have an idea that there is but one kind of scale insect, and that it will not live here. Now, the black scale dies nearly everywhere it goes in the interior. The structures of these small insects vary very much. The black scale is constructed in a very different manner from the red scale. Changes of temperature do not affect the red to the same extent that it does the black. It is only during the time of its hatching that it is affected very much, and there are a great many chances that they will hatch just at the time that you cannot use a spray upon the fruit. As a matter of fact, the scale is found all over the State, in localities where the black scale withers on account of the dryness of the atmosphere.

Mr. J. E. Cutter: I wish to say that it seems to me that one of the most important things that has been outlined and presented by speakers here to-day, is that of the importation of insect parasites. The parasite will do its work, and there is no question of whether it will harm the trees. We know it will harm only the scale. It will do the work cheaper, and all through nature we have found that they do their work very thoroughly. I think there should be a concerted action on the part of the horticulturists of this State, to impress upon the government the necessity of sending to the countries from which these scales have come to us, a man who will be qualified to study their habits, and secure to us the importation of such parasites as prey upon these insects. We should have a discussion of the issues of these matters pressed upon the attention of the authorities at Washington.

Mr. Klee: I do not like to take up the time of the convention, but the subject to which Mr. Cutter has referred is of great importance. About a year ago my attention was called to a beetle which was preying upon the so called San José scale in Santa Clara Valley. I was told that it had almost exterminated this scale in a certain orchard. I had seen some beetles in various parts of the State occasionally. I went there and examined it, and found that the facts were as stated. This particular orchard had been neglected; in fact, it had not been touched by a pruner or by any insect washes for three years. The man had cut off some of the branches of a large number of the trees, but it had very little cultivation afterwards. During that time this little ladybug was increasing, and when I examined it I found great masses of the pupæ of the insect seated on the trunk of pear and plum trees in that orchard, and I failed to find a single live scale. The trees had mainly recovered, and all the limbs were clean. The work which it had done was well done, but the orchard had been sadly neglected; in fact, for a year or two the crop was lost. I would not recommend waiting for this particular insect, because we have remedies for this San José scale. I believe in protecting this insect as much as possible, but I would not place full confidence in it. As regards this so much talked of *Icerya*, I believe that a parasite would do a vast amount of good on account of the habit of the *Icerya*. We may get all kinds of traps, may perfect our gas system and exterminate the scale on our trees, but the surroundings may hide them. The parasite would follow them everywhere, and would help us all the time. It would be of great importance if we could find out the enemy of this scale. I am certain from what I have read that in some of the countries of its nativity it is harmless. There must be an insect there which controls it. It would pay the fruit growers of Los Angeles alone to send a man abroad to study that insect if we could get the parasite. It is too long to wait for Congress to take action.

Dr. Kimball: I believe, as I told you this forenoon, that the great restorer of all things is nature, and it is our duty to make every effort that we can to find out her way, for that is the true way. I recollect that three years ago a gentleman in this county had an orchard in which were a variety of plums that were very badly infested with this so called San José scale. They tried various washes on it for one or two years and then gave it up for two or three years, and to the surprise of every one the orchard became entirely free from this pest which has proved so destructive, and it must have been done by some parasite. It was done so effectually that an examination of the whole field showed no scale whatever, the whole orchard being about thirty-five acres, and I believe that the closer we examine localities we will find that there are many portions of the State that have been infested with different species of insect pests which have been destroyed in that way. I believe it to be a practical impossibility for any man or class of men, or community in this State, to exclude by any mechanical means, the cottony cushion scale in Southern California, or even where it is found in and around the Bay counties. That there is any real specific about gas or wash that can be applied to effectually destroy it, I fail to believe. In regard to the gas proposition I would like to have one illustration of real practicability. If there is any person here that has seen it used I would like to have the information which he can give us as to its effective results.

Mr. Block: I would like to hear the results of the experimenting with this gas, so that it might be published. Even if it shall prove a success it would not be available for this season. Let us have some of the remedies for this season. I have experimented with some of the washes recommended by Mr. Cooke, and I believe that some of them require a great deal more strength than he recommends. We want to take care of the crop of fruit for the coming season. I would like to hear what Professor Riley would recommend as a wash for the San José scale, so that we can go home and try it.

Professor Riley: I said all that I needed to say this morning in reference to the gas that has been alluded to, and expressed my opinion that it would require from ten to fifteen or twenty minutes for the gas to act upon a tree. It will act differently upon different leaves, and differently upon the higher and lower parts of the tree. Another difficulty about the gas is that it must be prevented from escaping. For the reason that I gave this morning, I have faith in the discovery of a very valuable insecticide in this gas, but I feel as positively as I can in the matter, that in the years to come, so far as orange groves are concerned, we will depend more upon washes. Now, in regard to this particular white scale, the washes will be found satisfactory, as far as the application of them is concerned, and I think that we have in the kerosene emulsion a satisfactory remedy. I differ with the sentiments that have been expressed, that nature in time will take care of this pest. Sometimes nature is a very good servant, and sometimes she is a very bad one. I prefer using a remedy which gives satisfactory results without waiting, and would rather be ready to accept anything that promises well, and give it a trial. In regard to washes for the black scale, there are a great many caustic washes and potashes recommended by parties who have them for sale, and much injury has been done by many of them, in my opinion. Some of them are applied in such volume and force as to knock the insects off the tree. It is better to use a single gallon of wash in a proper manner upon a bearing tree, than to use fifteen and allow it to run from the tree in streams. A wash should not depend upon the force with which it is sent to penetrate the covering of the insect. The oil requires no especial force, if a mist is made that will envelop the tree, allowing the liquid to penetrate to every part of the leaves. That is the policy and theory of proper spraying. You will pardon me for speaking rather feelingly upon this subject, because I desire to give you what I consider the best method of destroying these insects. We must depend upon our own exertions, and we should not do ourselves justice, while we would be doing harm to those who are not here to listen to us, should we allow it to go forth that we are helpless in regard to this pest, because it is not so, and if you will take the formula that I have given, and the methods of application, not depending upon one application, but using at least three, I am satisfied that you will no longer fear that you are not masters of them. In regard to washes other than the kerosene emulsion, from experiments obtained last autumn from Mr. Wolfskill's place, there are some that I think are better than others which have been tried. There you have a simple wash. It should not be placed in the hands of an inexperienced Chinaman to be allowed to be thrown upon a tree fifteen or twenty gallons at a time, in the ordinary methods, but if properly applied will be a benefit. I prefer these resin soap washes to any of the caustic washes.

Mr. Block: What proportions do you apply, and how do you put it together?

Professor Riley: I have tried various methods, but I believe that No. 152, as published in my reports, would give the best results:

> There are various ways of making these resin soaps, one of the most satisfactory being as follows: Dissolve one pound caustic soda in one and a half gallons of water; then dissolve two pounds resin and one pound of tallow by moderate heat and add one quart of the lye, gradually, during the cooking, under continued stirring. If the mixture is good it becomes dark brown and thick; if whitish and flocky, the lye is too copious and strong and a little water should be added. After all the lye is in water may be added to make twenty-two pints of the soap, and this will make forty-four gallons of the wash, the cost of which will be less than half a cent a gallon.

This will destroy insects as fully as may be expected from one application by any wash. The resin acts upon the insect, not only killing it but causing the covering to dry up, and compelling it to separate from the bark. In other words, it affects the waxy matter of the *Icerya* by hardening it.

Mr. Block: I have a great deal of confidence in the recommendations of the Professor in regard to resin, because I have been using it for some time on a variety of fruits, such as the cherry and the peach, in preference to others that I cannot use in the summer without injuring the fruit. I made some experiments last summer in washing cherry and peach trees, and saved my crop by destroying a great deal of the San José scale. It was not perfectly satisfactory, but it was a trial, and I was very much pleased this morning when the Professor recommended it. I am very anxious to have this one published for our own benefit. I have no direct interest in orange growing, but I want to get all the light possible on the subject. We are all mutually interested in the prosperity of each other. We want to go home and try some of these things. We can, perhaps, put in a little less, or a little more, and in that manner get the proper proportions.

Dr. Chubb: I wish to say a word more to the fruit growers here. We are discussing this subject to-day mainly to a Riverside audience, where they are not troubled with these pests. We hope they never will be, but it is possible that it may be well to treasure what we have heard here to-day, because the time may come. But it is for the benefit of the fruit growers who are fighting this pest that I make the suggestion that in the use of experiments during the coming season those who are using them should write down all the distinctive experiments which they make, noting the date at which the young appear to be hatching, the time of spraying, the application which they have made, and the various remedies that they have tried, the amount applied and the immediate effects, the length of time intervening between the first and second applications, the number of applications, and the final result. At the next meeting, which we are permitted to attend, something definite might be attained. We should have made some progress; we should have something that we could set down as a fact that we have attained. The trouble has been, as I apprehend, that a great many who try an experiment which does not meet their expectations throw the method aside without marking the results or making any comparisons, and yet they are continually experimenting without getting any headway. We would do better to start at the very bottom, and even if we only get three steps a year, we should have accomplished something definite. As it is, we are perhaps making a dozen steps without knowing anything about it. If a person will take any of these applications that are recommended to be good and stick to it, and apply it thoroughly, and give us the results, it will not be many years before we shall know whether we can kill the scale or not.

Mr. Wilcox: My friend from Santa Clara, Mr. Block, is a very good pumper. He always draws out all he can, but I am under the impression that he could teach many of us, as he has had a great deal of experience. We had the San José scale to contend with, and our two principal remedies were kerosene and lye. The lye proved to be the most popular, because the oil as it was applied proved injurious to the tree, or was supposed to be. Some five or six years ago I planted a thousand pear trees. They were treated with lye one season, and afterwards headed back and treated again. I didn't lose one tree in the thousand. The next year I applied the lye and found that I lost several trees. The difficulty in applying the most of these washes is in not applying them at the proper time. It is necessary, too, in applying it to keep it stirred, so as to be of uniform strength. Within the last four or five years I have used caustic soda preparation, which was considered by some to be too strong. I also used soda in connection with whale oil. That has been a very effectual remedy in my orchard. I used a pound of soda to about twenty-five gallons of water. Mr. Block recommends a pound and a half. My son called my attention to the fact that it appeared to have a stimulating effect upon the young pear trees.

Mr. Ogden: In the discussion here about parasites it has been stated that two different orchards which had been neglected the parasites had gone in instead of the owner and had cleaned out the scale. Might there not be a question of whether the parasite was bred in the ground? Otherwise, why do they not attack the trees when cultivated?

Mr. Wilcox: It may be that in treating the trees we kill the parasites as well as the scale.

Mr. Klee: The insect which did this work in San José was not a parasite. It was what was called the ladybug. It is evidently a native insect, as I have found it all over the country, and the reason why it increased there was, undoubtedly, because its larva was not destroyed. Its larva is very soft and quite easily destroyed.

Mr. Block: I would like to ask whether this is the common ladybug.

Mr. Klee: No, sir; it is a very different insect. It is about half the size of the common ladybug and more circular in outline, and is of a bluish black, with one or two bright red spots on each wing.

Mr. Holmes: I have found a bug of that description to be very common here, and I feared that it might be something injurious, as I knew nothing about it.

THIRD SUBDIVISION OF PROGRAMME.

The President: I will state that all the efforts of the committee appointed to secure certain legislation have been futile.

Mr. Lelong: I wish to state that I was on the committee that asked the Legislature for additional help for the State Board of Horticulture. I was there and spent more than a month, and succeeded in getting a bill through the Senate, and to a first reading in the Assembly, but the Assembly adjourned so quick that it died on the files. Mr. Klee also spent two months there. We had a lawyer from San Francisco to draw up the bill which was presented to the Legislature. There seemed no objections to it. It died on the files for want of time.

Mr. Block: The proper time to agitate this subject will be just before the election.

The President: I would like to hear from Mr. Klee. He was on that committee.

Mr. Klee: Mr. President, as the President says, I was appointed on that committee. There was a great deal of difficulty in getting members together on that committee. After trying very hard for a month, we succeeded in getting one or two of the members together, and their views were expressed. As Mr. Lelong says, we got a lawyer from San Francisco, who was pronounced by people to be a very good lawyer. When we got the bill to Sacramento, it was of course referred to a committee. For more than two weeks we tried to obtain a hearing before that committee, but there was either no quorum, or the committee had other matters of importance to pass upon. Finally, when the matter was brought up, one or two lawyers who were on the committee criticised the bill, and said that it was drawn very badly. We thought it would be a loss of time to go over it. However, in the Senate the bill was accepted, and it was reported upon favorably. I then made a second attempt to get the bill before the Assembly. I would state that two bills were drawn embodying our wants. The last bill introduced was very much criticised by the Assembly committee, and we thought at one time that they would not report favorably on it, but they did, and it might have got through the Assembly, but it failed for want of time. The bill which Mr. Lelong refers to, provided for the appointment of two Inspectors, so that the large territory of California could be divided up and more special attention given to the different sections, and it had a fair chance to pass. It met with hardly any objection in the Senate, but with some in the Assembly, but through the efforts of Mr. Rose it was reported upon favorably in the Assembly, and it was simply for want of time that it failed to pass. I would state that this was my first effort at lobbying, and I did not find the employment a very congenial one. I wasted much time, and I should hesitate before going on the same errand again. I neglected my duties by staying at the Capital so much, and I returned in a very disgusted mood.

Mr. Chubb: I was going to say that I believed, in the absence of legislation upon the matter, the fruit growers would have to become a law unto themselves; that in districts like Riverside, which are almost, if not entirely, exempt from the presence of these pests, the secret of permanent success is in strict, thorough, and continuous watching and guarding against the advent of these pests. Of course, it may be impossible to prevent their spreading over the entire orange growing districts, but they can certainly be kept in check and be held at bay for years. Knowing the danger, as these people do, of allowing their advent, a strict watch should be kept up against their coming. In districts where they have already obtained a foothold the result is going to be, I may say, one of "the survival of the fittest." We have many orange growers who will never be able to grow oranges properly. When they find the scale insects are getting into their orchards they will be cutting out the trees and replacing them with other fruits instead of resorting to thorough work to get rid of the pests. Those who have faith in the success of orange growing will stick to it, and will derive enough extra profits from the sale of the fruits which they do save to enable them to apply these remedies, so that the thorough and effective orange grower will survive in the absence of legislative encouragement. Of course, all the aid we can get in that direction will be welcome, but we must not wait for it. We must consider the industry of sufficient value and importance to use the means within our hands and within our reach to accomplish our purposes. I do not believe we will be seconded in our efforts to any great extent. It is too much the custom of people when anything of this nature comes up to ask the Legislature for assistance. The real effectiveness rests with the people themselves. If we exercise it, possibly there will be no reason for asking the Legislature to assist us in making experiments which they too often consider of a doubtful efficacy.

Here the convention adjourned until Thursday, at nine o'clock.

FOURTH DAY.

Convention called to order.

Mr. Wilcox: Mr. President, I have the following resolution to offer:

Resolved, That the thanks of this convention are due to, and are hereby tendered to, Professor Riley, for the very interesting and instructive address which he has given us; and we ask its publication for the benefit of the fruit growers of this State.

Adopted.

The President: I recommend that this convention instruct the State Board to take some action in regard to the interstate commerce bill, fearing that it will raise the rates on fruit to eastern shippers.

Mr. Block: As a member of the Fruit Growers' Union, and as a member of a committee appointed by that union, at Sacramento, I will make a statement in regard to that. I was appointed in connection with a number of others to call upon the railroad company, and ascertain whether we could procure a reduction of freights. There have been certain influences at work to procure the assistance of the Board of Trade and the Chamber of Commerce, at San Francisco, for a reduction of freights. They appointed a committee to assist, and telegraphed to Messrs. Huntington and Crocker, and asked them to comply with our request, if possible, for a reduction of freights. We had several interviews with them, and also with the representatives of several of the eastern railroads. Some of the representatives were disposed to agree with our terms, but some were not. So we went to headquarters to see whether they would not concede what we asked. We appointed Mr. Lubin to see Messrs. Huntington and Crocker, and we telegraphed to them also. I got Mr. D. O. Mills to go with me, and at last we got a dispatch from Messrs. Huntington and Crocker, instructing Mr. Dunn to accept our proposition, unless he knew of other reasons for refusing them. A committee of the fruit union then waited upon Mr. Dunn. I went to see him, and he said that he had instructions from Messrs. Huntington and Crocker, and that they were disposed to comply with them; that he did not see any objections, unless it was from the effect of the interstate commerce bill, which at that time had passed the Senate, with every probability that it would pass the House the next day; that he did not know how far that would interfere with it, but that he would let us know. Up to this time we have not received his answer; and the matter stands in that position. I think it would be good policy for this convention to assist and place such authority in the hands of the fruit union as would hold Mr. Dunn to his agreement; and if we find anything in the law that would prevent his complying with our request, get the Interstate Commerce Commission to rule in our favor, and make the concessions which they have the right to make under the fourth section of that bill.

The following resolution was then offered by Mr. Peck:

WHEREAS, The fruit growers of this State are in a condition of uncertainty in regard to the freight tariff on fruit shipments to eastern points; and, whereas, the railroad authorities have promised much needed concessions in rates of freight on fruit from California, provided they are permitted to do so by the interstate commerce bill.

Resolved, That the State Board of Horticulture be requested to take such steps as they may deem necessary to bring the matter of fruit shipments from this coast before the Interstate Commerce Commission at as early a date as possible, with the object of procuring the necessary concessions in transportation for the fruit growers of this State.

Resolved, That all associations and persons interested in the growth and development of the great fruit industries of the State, are requested to use their individual influence by petition to the Interstate Commerce Commission to provide the relief necessary to the very existence and future advancement of fruit culture in California.

Adopted.

MR. WILCOX: Mr. President, perhaps I may add a little to the history of this effort between the fruit growers and the railroad companies. We paid about $800 a car for fruit from San Francisco to Chicago two years ago. About that time we had it reduced to $600. It was done through the efforts of a fruit growers convention, held at that time, at a meeting like this, under the direction of the State Board of Horticulture, at Sacramento, and we have only succeeded in getting reduced fares through these combined efforts. The time has passed when these high rates are necessary. They have assured us that freight should be reduced according to our request. They say that there is nothing now in the way of a reduction except this interstate commerce bill, and we should remind them now that we expect the reduction, and it is necessary that they should do it on many kinds of fruit.

DR. KIMBALL: Would it not be wise to amend that resolution by soliciting the coöperation of the shippers of Southern California. We should have a committee appointed representing all the shipping interests of California.

MR. BLOCK: There is a standing committee that has been appointed by the fruit growers which may be sufficient, and it may not be necessary for the State Board to act. It might be well for all others to coöperate with them. They have got the authority, and of course need all the support and assistance that they can get. Some effort should be made to get the matter before the Interstate Commerce Commission. I notice that Governor Stanford has gone before the Commission and asked to be allowed to carry goods from Japan and China at reduced rates, showing that it is their interest. Now, we are much more interested in this freight proposition than they are, and in fact, it is necessary for us to look out for ourselves. Governor Stanford did not think it necessary to represent us in this matter at all. Let us give our cordial support to the committee that has been appointed. We are not the only ones interested. Everybody is indirectly interested with us who lives in the State. The State Board of Horticulture knows no north, no south, no east, and no west. We are here for the benefit of the whole State.

THE PRESIDENT: I would like to make a suggestion in regard to the amendment proposed by Dr. Kimball. It would be out of place to attach any other committee to this one in any way, but it is intended to ask the State Board of Horticulture to make such representations as they may deem necessary.

Dr. Kimball: I did not introduce any amendment, but merely made a suggestion as a matter of unanimity, and as a matter of adding power to the hands of the State Board. This is one of the great industries of the State, and every one should use his influence for the purpose of reaching this result.

Mr. Chester: I am requested to offer the following resolutions:

Resolved, That in view of the rapidly increasing fruit industries on this coast, and the destructive spread of insect pests, that the Chair of Entomology in the State University should be filled at the earliest practicable date, and that provision therefor should be at once made from the funds provided by the Legislature for the support of the University.

Mr. Wilcox: In seconding the resolution, I would say, that the University has been very liberally endowed during the last year, having also the control and management of the State Viticultural Society and the funds placed in their hands. They have 1 per cent on the $100 on all the taxable property in the State, and it will create an immense fund. It will endow the University so as to make it one of the first institutions in the land. They have a large amount of money at interest at the present time, and should provide for all these matters.

Mr. Klee: I think it is of the greatest importance that this matter should be urged. There is a Chair at the University of California of Entomology, which was created, I think, three years ago, but so far, it has never been filled. In view of the fact that the law passed at our last Legislature, making the teaching of entomology compulsory in our schools, it seems plain that there ought to be at the State University some one to teach the teachers; and for that purpose alone, it would be a most useful and timely appointment. Besides, there are many other matters of insect pests, which are not confined to fruits. The Hessian fly has appeared in this State, and many other insects. I think it is a most timely resolution, and I hope it will be adopted.

Adopted.

Resolved, That a committee of three be appointed by the President to prepare a memorial to Congress, setting forth the needs of this coast in the matters of exterminating insect pests, and asking an adequate appropriation to be used by the Division of Entomology in the Agricultural Department of the United States in the investigation of the parasites and predacious insects of the white scale, and all injurious scale insects in its native country, Australia, and their introduction to this country.

Mr. Klee: I move that there be added to the resolution, where it reads "parasites," "and predacious insects, and such insects as prey upon the scale." It would probably be quite as important, as we do not know which it is. There must be a great check on it, otherwise those countries where it belongs would be devastated by it. I would suggest that this resolution be made also to include the red scale.

The President: It would be well enough for us to understand whether this resolution, in its original form, is intended to meet only the *Icerya*, or whether it is intended to import parasites of all the other scale insects.

Dr. Chubb: I understand that in Santa Ana Valley that our particular character of red scale came directly from Australia, and that we have the means of tracing it there directly. It came by importing cuttings for budding and grafting purposes from Australia directly to our vicinity, and we have the means of proving it positively, and I think myself the resolution should be general in its character, because it is designed to cover the remedy for one particular scale, while it ought to investigate all remedies for scale that prey upon citrus fruits. It is understood that the scale is very damaging in southern Africa, where they also grow citrus fruits; where in places their orchards are entirely ruined, and I think we should have a right to know whether there are any insects there which exterminate the scale. We want the Department to investigate the enemies of citrus fruits in other countries where they have originated, to know whether we can rely upon getting a parasite to assist us, or whether we must battle with the pests by other means. I would like to have the resolution as general as possible in its features.

The President: I would suggest that the amendment be put in proper shape before the convention. I think it was Professor Riley's idea to send an eminent entomologist to all those countries. At least we ought to include in that all the parasites of Australia and New Zealand.

Mr. Block: I do not know what Professor Riley's idea was, but it strikes me that it would be well to cover all these insects. I hope that the resolution will be amended so as to take in all kinds of scale.

Dr. Kimball: It is not alone those found in Australia that we want to cover. Insects have been imported from the entire world. The fact that the population of California is composed of almost every nationality on the earth, and that the different fruits of every place have been brought here for acclimation by them, accounts for the great variety of pests which we have. We have received certain classes of insects from South Africa, that are just as bad as those which we have received from Australia, and in fact it is a mooted question whether these insects have all come from Australia. New Zealand is full of them. So is South Africa. I would have a commission to go and make a thorough examination of all the different countries, and it would be well to include South Africa, because southern Africa has been devastated by these same pests, so that the great fruit industries there have had their very existence threatened, and if there be such entomologists appointed I should approve of taking in everything that would give us any light upon the subject. I believe that the great relief which we will get from these insects in California will be, and must be, by the importation of parasites. Thirty odd years ago I was in Australia some nine or ten months. At that time I took very little interest in the matter, as I was engaged in other business; but they recognized at that time that there were circumstances existing which were inimical to the profitable raising of fruit. I presume they had reference to the scale. I believe that they have always existed in different parts of the world, and that the reason why they have been kept in check is because of the existence of parasites among them.

Mr. Wilcox: I quite agree with Dr. Kimball that it is very necessary to know the habits of these insects which we get from other parts of the world. I quite agree with the resolution of the Professor, that the assistance should come from our Government, but I fear that the Government would hardly consent to create such a commission which would make so great an outlay of money. The National Government is like the State in that respect. If you ask for an appropriation for a thing of this kind, they will only give you a part of what you want. While I believe that an entomologist might be sent to investigate these insects in the country from which we know they came, and to which we are really nearer than they are, I do not think we could get an appropriation sufficient to send one to all those countries. I prefer that it be confined to the words of the resolution as more likely to accomplish the object.

Mr. Block: Whether Congress or the Legislature makes a habit of reducing the amount of an appropriation asked for, which I have no doubt is the case, is no good reason why we should not demand what is right.

It is necessary for us to act in such a way as to bring this matter properly before them. We should be right in our demands, whether Congress says "Yes" or "No." All we want is to be right, and go ahead. It is said that we must use a little policy about this, because, if we go before Congress and ask for an appropriation of a hundred thousand dollars we will get no more than about twenty thousand dollars. I believe in people asking of their servants just what they require, and no more. In regard to this insect, it should read "the scale insects"—that would include them all and not limit them to Australia—"injurious to the fruit productions of the country," not only in California, but also in Florida. Let us recommend that Congress make an appropriation to investigate the habits of the injurious scale insect, as well as the parasite.

Dr. Kimball: Notwithstanding it is true that Professor Riley is a very distinguished entomologist and has given a great many years to the study of everything connected with these injurious insects, which are injurious to the industries of the United States, still there are insects existing in different parts of the world of which he has no personal knowledge, and it is only through agents that anything can be accomplished. But, at this particular time, the industries, especially of the fruit growing people of the Pacific Coast, whose very existence is seemingly threatened by these insects, it is the duty of Congress to give us the few thousand dollars necessary to pay the expenses of an entomologist, or a half dozen, to examine these pests in different parts of the world from which these insects have been imported. The very expenses of some unknown Consul to some unimportant part of the earth would more than pay the expenses of all the entomologists that we want to search out and find for us the necessary relief. I believe that the fruit growers should ask it as a right and not as a favor, for the very existence of one of the greatest industries of the United States is threatened, and the appointment of a few petty officers to foreign ports is as nothing in comparison. I believe that these matters should be brought about by our Representatives and Senators, and that if they would use their combined influence the matter could be properly presented and we could have the appropriation, and there would be no question about it. Everybody recognizes the magnitude of the fruit industry, not only here, but in the East, and has the greatest possible interest in its development.

Dr. Chubb: I apprehend that in case we are to apply for something in the way of relief in this direction, that it would not be necessary to ask that the entomologist travel all over the earth, but to a given point to investigate the insect pests and their parasites. Now, if they will send an entomologist to Australia, the easiest point reached where information may be obtained, we should have a right to expect, as a matter of course, that the officer will, in making his investigations, make it a point to take in everything in connection with citrus fruits growing, and endeavor to obtain comparative statements, and results, and facts in regard to this question, so that on his return he will have competent and actual facts as far as they can be obtained, and we hope, be able to give us the basis by which we can protect our future operations in this direction. I would not be in favor of spreading the matter too wide, but of asking that the entomologist be sent to Australia to investigate the whole subject as far as lies in his power without additional expense in the way of traveling.

Mr. Klee: I think as the gentleman has stated, that Professor Riley has thought over this matter a great deal, and I would rather adhere to his resolution just as it is. Any one who goes there as an entomologist will find out all these things. He will investigate the others as well, and we do not want to make Congress believe that we want an army of entomologists sent all over the world. At the last session, Congress would not allow an appropriation to send them to foreign countries, and he may be right in asking this matter in this shape now.

Dr. Kimball: While two or three years of time will be taken up getting these men sent to Australia and New Zealand, this coast is, in the meantime, to be left at the mercy of these insects. The money that it would cost would not be over $10,000 or $20,000, and is as nothing to the interests that are at stake, and the results that could be obtained. The money could be furnished here in Riverside, if necessary, or at San Gabriel or Los Angeles, and other parts of the State.

Mr. Wilcox: I do not believe that Congress will make such a radical movement as we ask, knowing what I do of the difficulties with which Professor Riley has had to contend to get the necessary appropriations which have been made so far. I agree with the gentleman, that we have interests of the greatest magnitude threatened, and that this has been wofully neglected. We have had assistance in the way of reports from the Board of Agriculture. We are a liberal people. We gave more for educational purposes at the last session of the Legislature than any other State in the Union, according to our population; and we have given for many other purposes, and we will have to give to fight these insect pests. Why should we not have assistance? We have a country here that will compare favorably with the countries of the Mediterranean—a country that produces bread; which has a reputation equal to those of remote times for making wines, for producing figs and prunes, such as we read of in the Bible—the "land of the olive and the vine." We have that kind of land right here all over this coast. I may be an old crank in the matter, but I believe in the future of the fruit industries of this State. I am in favor of asking as much as anybody from the Government, provided I see any way of getting it. I believe it would be better at present not to ask for too much.

The President: I understand that the amendment now is to include all these insect pests in Australia, New Zealand, and South Africa.

The resolution was read as amended. The amendment is: "And all scale insects found in Australia, New Zealand, and South Africa."

Mr. Klee: It seems to me that the amendment is altogether too broad. It seems too much of a work. I believe in confining it to the original resolution.

Mr. Finch: I would suggest that all these questions could be answered as to the habits of these insects, and all this information could be gained by correspondence with our Consuls in those countries. Some very interesting questions have been propounded to some of our Consuls, and have been very intelligently answered, in regard to other matters connected with raisin and orange growing.

Mr. Blanchard: I move to strike out "*South Africa.*" It strikes me that we are more likely to get an appropriation by not asking too much. It is my opinion that South Africa is quite as new in the fruit line as California.

Dr. Chubb: I move to reconsider the vote on the matter.

Dr. Kimball: I do not wish to consume much time, but we should act intelligently on the matter. The gentleman suggested that the different Consuls and officials scattered throughout the world in the pay of the Department could answer these questions, but I would like to ask him how many of them know anything about this insect pest, and how many are capable of investigating the habits and character of them, and of the parasites who attack them. My intercourse with them in the different parts of the world where I have had a very limited experience, has shown me that they are seeking only their individual interests, and I know many of them who are paid by the Government who would not answer a civil question.

THE PRESIDENT: I must call the gentleman to order. That is not before the convention. I have carefully read the reports of all those who are in the Department and they will not answer our purpose. We have got to have scientific educators and entomologists. The reconsideration of the amendment is before the convention.

MR. WILCOX: One reason why we should strike out the amendment, is that we have but a few practical entomologists who are capable of making the proper investigations, and another is that we can get a report sooner by confining it to one country. For these reasons as well as what was said by Professor Riley, I think we had better vote the amendment down, and adopt the original resolution.

Amendment voted down.

THE PRESIDENT: The original resolution is now in order.

MR. BLOCK: I would like to make a suggestion for the purpose of making it effectual. If you send a memorial to Congress, it will be read, indexed, and go to a pigeonhole, and that is the last of it. I would suggest that it have the indorsement of the President and Secretary of this convention, and that it be sent to every Representative of this State, and to our Senators, with the request that they ask an appropriation and assistance; and then, I venture to say, it will not be neglected in that manner, and I move that this be done.

Motion carried, and resolution adopted.

MR. HOLT: Is it the understanding that the words, "and all other scale insects," have been voted down?

DR. KIMBALL: I think the words, "all other insects of the scale family," should be adopted.

MR. WILCOX: I think it would be very proper, and it would take no more time to make it to read, "all other insects that may be found there."

MR. HOLT: I did not understand that we were going to vote down anything except "*New Zealand* and *South Africa*." I desired to vote for the proposition, so that it might include the others as much as the *Icerya*.

MR. FINCH: As I voted in favor of the proposition, as finally carried, I will now move that we reconsider for the purposes of this amendment.

Motion to reconsider carried.

MR. HOLT: I now move that the original resolution be amended so as to include the words, "and all scale insects."

MR. KLEE: I do not want to speak against everybody here, but I may be one of those who are impressed with the vast number of the scale insects. There are hundreds of kinds, and if we ask an investigation of all of them, it may appear too much.

MR. BLOCK: Mr. Klee's proposition reminds me that if I was hungry and had had nothing to eat for thirty-six hours, and should come home, and have placed before me a spoonful of something to eat, it would be outrageous for me to ask for a plateful. There are a great many of these scales, and we want them investigated. One of them has cost me $10,000, and I expect to pay it yet. At the same time, I respect the opinions of my friends who differ with me. Yet, I would ask what is right in this matter. I want this to be as broad as has been suggested by Mr. Holt, and I do not know but we ought to put in the qualifying words, "injurious insects."

MR. HOLT: I have no objection to the word, "injurious."

MR. CHUBB: I do not apprehend that it is so much the question of the scales which we want investigated, as it is the parasite which destroys the scale. If we can find an insect in Australia which is worth cultivating, which destroys the white scale, it is probable that the same insect may be found to be an enemy to the red scale, or that some other may. I think that the point of our resolution is included in that class of insects, and that it may not be a matter of so much importance to include only the three scale insects. It is the insect which preys upon that scale which we are attempting to investigate.

Mr. Holt: There is nothing unreasonable at all in asking Congress, if we are going to make any move at all in this direction, to appoint an entomologist to go to Australia and investigate the injurious scale insects there, and, of course, that includes the insects which prey upon them. If we should go to work and single out one or two, it would look ridiculous upon its face, and the proposition should include the whole business, so far as injurious insects are concerned to the fruit industries of this coast.

Mr. Holmes: This resolution puts the matter in the hands of the committee, as I understand it, and it seems to me that some latitude might be given that committee to cover these points. We are wasting valuable time on trifling matters. They can word that resolution in such a manner as to cover that ground.

Mr. Holt: The amendment is before the house now, as I understand it, and I want it to be understood that it is to include the words, "all injurious scale insects in their native country, Australia."

Mr. Wilcox: I ask that it be amended so as to include the words "injurious to fruit."

Mr. Holt: I accept that.

Original resolution then adopted as amended.

At this point the essay by Mr. A. S. Chapman, of San Gabriel, was called for, and was read as follows:

FERTILIZATION OF ORANGE ORCHARDS.

Plants feed on the same elements but in varying proportions. Among the most important may be mentioned phosphoric acid, potash, lime, magnesia, and nitrogen, which are found only in small available quantities in the soil, although they may exist in large quantities in an unavailable condition.

According to Professor Johnson, "From 95 to 99 per cent of the entire mass (weight) of agricultural plants is derived directly or indirectly from the atmosphere. And from the atmosphere the crop can derive no appreciable quantity of those elements that are found in the ash."

To the soil, therefore, must we look for our supply of plant food, by rendering available the inert material, and when that quantity is too feeble to supply artificially what it may be deficient in.

The soils of Southern California, Professor Hilgard says, are generally deficient in phosphates, a most necessary constituent of plant food and generally the first to become exhausted. They are as a general thing rich in potash, and nitric acid, the conveyer of nitrogen to the plant, depends greatly on ourselves, nitrates being formed by the oxidation of ammonia in the soil derived from the slow decay of organic matter in the soil, and proceeds most rapidly at a temperature of 70° to 80° F., which accounts for an abundance of acid in the summer and a lack of same in early spring. The formation of nitrate of potash is a most interesting study to the farmer. Only within the past few years has it been discovered that the nitrate is formed through a fermentation produced by bacteria in the presence of humus, lime, and potash.

The carbon of the plant is derived through the leaf from the carbonic acid of the atmosphere; therefore may weeds become beneficial to the soil. By being matured and plowed under they keep the soil in a fine mechanical condition, retentive of moisture. They supply nitrogenous material for oxidation into nitric acid. They supply the water of the soil with carbonic acid, which has a "high solvent power on the carbonates of lime, magnesia, protoxide of iron, and protoxide of manganese. When carbonated water comes into contact with siliceous minerals they are decomposed much more rapidly than by pure water."

The general mode of fertilizing in this country seems to be principally tillage, with an occasional dressing of some manure once every two or three years, and copious irrigation. Now, it would seem that this constant irrigation with pure water, as it is in the San Gabriel Valley, would wash from the soil its soluble salts, not only depriving it of them, but to an extent leaching and making the soil less subject to hydroscopic water. And again, when thorough tillage is resorted to, to the exclusion of manure, it stimulates the soil beyond the powers of endurance, the vegetable mold is rapidly used up, the available phosphoric acid reverts to an insoluble condition, and the soil thus left in its primary condition is subject to bake and form hardpan. And again, where heavy manuring is resorted to, say once in three years as is sometimes done here, then do parts of the plant food revert to an inert form and the great quantity of organic matter becomes acid and sours the soil unless it be an exceedingly calcareous one.

On my father's place at San Gabriel we choose to manure lightly and often by shoveling sheep manure into the irrigating ditches, allowing each tree to receive about twenty-five pounds at each separate irrigation. Our basins cover the entire surface of the ground. We make no effort to choke such weeds as clover, alfilerilla, and the like; but the irrigator with his hoe destroys the obnoxious nightshade, hoarhound, and nettle.

In the fall of the year we follow with a copious liming—about three barrels of unslacked lime to the acre—applied in the following manner at the head of our irrigating ditch: We plant a box about three feet wide, six feet long, two feet deep, and six inches under the surface of the running water. In it we place a barrel of the lime. It slacks and swells to twice its original bulk. A man stands on this with his hoe and sees that the water carries it off evenly. With an irrigating head such as we use, a man will run into the ditch four barrels a day, or about three barrels to the acre. We now leave the orange orchard till spring, when we plow under weeds, manure, and lime. We thus aim to supply our soil with nitrate of lime, potash, and magnesia. Carbonic acid gas is absorbed by the water and attacks the inert plant food in the soil; hardpan is prevented both by the mechanical effects of the vegetable matter and the lime.

Mr. Block: I move that this essay be published. I want to ask whether the water running in that manner takes up all the lime?

Mr. Chapman: On our ranch we have a considerable fall, and the water runs very rapidly; but it takes up all the lime, and the water runs white, like milk.

Mr. Klee: I think there are some very excellent points made in this essay, and some that people in all parts of the State might take to themselves. There is an increased tendency to use too much cultivation, and too little plowing. There are many sections in this State where they are cultivating all the time, and hardly allow a weed to grow. Now, in soils deficient in humus that evidently is a great mistake. I think that on light soils a great deal is gained by adding the weed crop, when green. In heavy soils there is the matter of the chemical condition; and it will always be a benefit to turn under the weeds and green material that is growing.

The President: The next subdivision embraces the whole subject of freight unions. That was a question which we had under discussion in Los Angeles, in November, 1885, as well as at the convention held in Sacramento last November; and if no one wishes to bring the question up here, as it seems to have been thoroughly disposed of, then we will pass it and go on to No. 3.

Dr. Chubb: If it is in order, I would like to say a word in regard to that point, and I would like to add that the discussion referred to, both at Los Angeles and at Sacramento, where I was present, have resulted, as is admitted on all hands, in great good to the gruit growers of this State, having been put to practical test, and in practical operation; and the prices on grain and fruit from this State have been greatly enhanced in value, and the profits have undoubtedly been much larger than before. That is, during the year following that convention and the present year they have been greatly enhanced. It has generally been conceded that the means taken to organize the marketing of our fruits, and to systematize the placing of them upon the eastern markets, has informed them of our capacities for fruit growing, and our desire for obtaining fair prices; and has largely enhanced the demand in the East for California fruits, as well as largely increased the price. It has resulted also in another very important matter, and that is, that instead of sending our fruit, as we did two years ago this last winter, now almost all the fruit is purchased for cash right at our doors. The local dealers were stimulated by our action last winter to obtain fruit, in order to keep up their business, else all the fruit would have gone through our unions to the different agents selected in the eastern markets, and the result is that dealers have commenced to pay cash for crops, and send them to the eastern markets. Three fourths of all the oranges produced in Southern California have been sold for cash; and we feel highly gratified at the results obtained through the decision of that important question: "How to market our fruits."

The President then called for a letter from **Mr. Allegretti**, of West Berkeley, which was read by the Secretary, as follows:

West Berkeley, April 9, 1887.

To the President and Members of the Horticultural Convention and Citrus Fair, assembled at Riverside, April 11, 1887:

Mr. President and Gentlemen of the Convention: Noticing that the second subject of discussion on your programme is that of preparation, marketing, and disposing of fruit, and being in possession of some facts that I believe to be of great value to the fruit interests of this coast, and bearing principally on those points, I have taken the liberty, and this means (being unable to attend personally), of laying them before you, and will do so in as few words as possible.

After twenty years of experimenting and study I have perfected the process known as "The Allegretti Air Purifier and Preserving Room System," which is secured and covered by three different patents. It consists of building a receiving room, or treating house, of any capacity agreed upon, in which the fruit can be stored and treated, just as it comes from the orchard, without changing the original package or box; the time required for treating is from one to five days, according to the quantity; fruit so treated can be put on fruit car without any other preparation, and will keep from six to eight days.

When a longer period is needed in transit, say from eight to sixteen days, the car can (at a trifling extra expense) be so prepared that it will keep the fruit for that length of time. If it should, however, be desired to ship the fruit as ordinary freight, then the car could be so prepared—after the plan of the treating house—that a thirty days' transit would be no injury to its contents; again, should the market at that point of destination be glutted, a receiving house might be built, into which the cars might unload, and their contents be held for a better market.

These treating houses can be built at any place desired, and after instruction are easily managed.

One of the advantages of which is, that the fruit may be picked as it ripens, put into the treating house and kept there, in its perfect, natural state, until there is sufficient to load a car, if so desired.

The principal item of expense in this system is the building of the treating house, which will vary according to its capacity; the cost of treating the fruit, especially in large quantities, being nominal; smaller lots, say from ten to twenty tons, will not exceed one quarter of a cent per pound.

Fruit preserved by this process differs from that preserved in refrigerators, in the fact that the latter commences to decay almost immediately after it is taken out, while the former will stand longer even than when first picked from the tree or vine, as the case may be.

For the corroboration of the above facts, I respectfully refer to Messrs. A. T. Hatch, Suisun; C. F. Crocker, San Francisco; W. W. Smith, Vacaville; Dr. Stenzel, Martinez; I. A. Wilcox, Santa Clara, and Prof. E. W. Hilgard, of the University of California. Any further information on the subject will be cheerfully given upon application.

Yours, most respectfully,

I. ALLEGRETTI.

The President then introduced MR. G. M. STONE, who addressed the convention:

MR. PRESIDENT, GENTLEMEN OF THE CONVENTION: It would be impossible for me, on this short notice, to do the subject, "Cold Storage," justice. I will, however, try to convey to the convention some idea of the manner in which it is applied by the Interocean Cold Storage and Shipping Company of Riverside, to the preparation of fruit for transportation long distances, and the preservation of the same for a long period.

"Cold Storage" suggests at once to one uninformed, the use of a large quantity of ice, thus producing a damp, moist cold, the effect of which, many of you know by experience, to be very disastrous to fruit. As we apply it, it is directly the opposite, using nothing but a perfectly dry cold. This we secure by the circulation of brine, first cooled to a low degree through coils of pipe, so arranged as to produce a circulation of cold, dry air, so that no ice whatever comes in contact with your fruit. In this manner we extract whatever latent heat or moisture there may be in the fruit, rendering it perfectly dry and of an even temperature before loading into the cars. We use for the transportation of these fruits the Tiffany summer and winter car, which we reduce to the same temperature as that to which the fruits have been cooled before loading them, and maintain it en route by the addition of ice at points along the route where needed, thus subjecting the fruits to no change of temperature from the time they are loaded into the car at Riverside, until prepared for unloading at New York, Boston, Chicago, or whatever point to which the goods may be consigned.

I think that you will agree with me that heat and moisture are the principal causes of the cry we so often hear of "rot and decay." Remove this as we do, and your fruit will carry successfully to the most remote markets; in fact, we have letters testimonial of the excellent condition in which fruit treated by us is arriving in all the principal markets of the United States.

There are many assertions made that fruits cannot be treated successfully by cold storage. What is the reason of these failures? It is simply that cold storage, as applied by those making the experiments, has been improperly handled. There is a proper and an improper way to apply cold storage. All the bad results obtained from cold storage can be traced directly to this improper handling. For instance, it has been the custom to expose fruits taken from, say, for example, a temperature of 45° and expose it to the atmosphere, say, of 80° or 90°. Is it any wonder that the result has been unsatisfactory? Of course, the fruit so exposed would attract whatever moisture there might be in the atmosphere, and this would at once begin the work of decay. On the other hand, had the fruit been properly handled, and raised to a temperature somewhere near that of the outside before being exposed, there would have been none of these effects, and the fruit would have had the same life as when taken from the trees. By a very little care, and the exercising of common business principles, all these ill effects are overcome.

Again, in the handling of your grapes, apricots, peaches, pears, and all deciduous fruits in the past, you have been compelled to use the express, paying enormous freights for quick transportation, thus materially lessening your profits. This you were forced to do in order to get your products of this class to market in the quickest possible time, owing to the highly perishable properties of the same, and then, with all of these precautions, you have many times met with very indifferent success, at the same time never reaching the far distant markets of the Atlantic seaboard. By the use of cold storage, as applied by the Interocean Cold Storage and Shipping Company, you will be enabled to reach these markets with your most perishable fruits, thus opening up to you a much larger field and bringing your fruits in less competition with each other, and at the same time your rates of freight will not be nearly as high, for by this system a difference of two or three days matters not, as the fruit knows no change. For example, last season, while you were paying $600 per car for express service on grapes, they were being taken by the cold storage process from Santa Ana to Chicago for $230, a saving in freight alone of $370 in favor of cold storage, besides having your grapes delivered there in a much better condition than when hauled by express, and netting a profit instead of being called upon to remit from this end to pay the freight.

One more point, gentlemen, and I will trespass no further upon your time. We have heard read in this convention a letter saying that it took from four to five days to prepare the fruit for a haul of from six to seven days' duration, and a second preparation for a longer haul and the additional preparation of the car for the same purpose. By our system we can prepare your fruits in twenty-four hours, as a usual thing, and never to exceed forty-eight hours, for a haul, if needs be, to New York City and return.

Again, Mr. Allegretti closes his letter with the assertion that "fruit treated by the cold storage process commences to decay as soon as removed." (These may not be his exact words, but they convey the same idea.) Gentlemen, in refutation of that statement, which is radically wrong, I wish to call your attention to the fruit now on exhibition on yonder table. There is fruit that was placed in our cooling house February ninth, by Messrs. Griffin & Skelley, and removed March twenty-eighth, in the presence of Mr. L. M. Holt, taken to Griffin & Skelley's warehouse, there unpacked in the presence of Rev. George H. Deere, L. M. Holt, and E. R. Skelley, and found to be in a perfect state of preservation, not a single decayed orange or lemon being found, since which time it has remained there subject to all the variation of the temperature, and brought to this hall April eleventh, after having been out of cold storage exposed for fourteen days. There are also six boxes of citrus fruits on the same table that were placed in our house the same date, February ninth, by the same firm, and removed here the morning of April eleventh by them, having been treated by us for sixty-two days. I invite a careful examination of the same and see if you can detect any ill effects of cold storage. On the contrary, you will see that the fruit has improved by its treatment, and has still as long a life as when removed from the trees.

Gentlemen, these experiments were made and watched by reputable business men of this community who wished to know just what could be accomplished by cold storage in the treatment of citrus fruits. The result is before you and speaks for itself.

Mr. Wilcox: I would like to ask whether this is the same cold storage process which is referred to in Mr. Allegretti's letter?

Mr. Stowe: This is cold storage, as we have applied it for the last nine years.

Mr. Wilcox: As I have been referred to in Mr. Allegretti's letter, it will probably not be out of place for me to state his position. He claims to have studied the cold storage business, and has documents to show that he has been in the business many years. By invitation I visited his establishment. He claims, as I understand, that there is no chemical process of application. It was through the invitation of Professor Hilgard that I submitted some strawberries to that process about a year ago. They were picked the first of the season, and were allowed to get very ripe—so much so that some of them had come to be past their time. There were many of them that had little holes, which had been picked in them by the birds. They were in a condition to become decomposed in warm weather very rapidly; but after being put in that cold storage building, under the process, and retained there some three weeks, I went there and found them in the same condition in which they were when put in, and to all appearances they had the same gloss and freshness as when picked in the field. Professor Hilgard sent down a box at the same time, and they were sealed up carefully, and put in in such a way that they could not be tampered with, and also came out all right; and I am satisfied that there is a great deal of merit in it, although I do not know whether there is any more than in this process here. I am very much pleased and surprised at seeing the exhibit that has been made here. I believe there is merit in it; and if there is, California fruit will be able to control the market hereafter. I notice in putting my hand on this fruit here that it has the same feeling and touch that the fruit had which I sent down there. He claims, also, that his fruit, by being "processed," as he calls it, will last longer. I found out by shipping vegetables many years ago that I had to keep the temperature of them about at the same degree, in order to have them come out all right. Our fruits which went to New Orleans went to a warm latitude. It is very much such a climate as we have had here for the last three days as they have in the "Sunny South." It is not cold enough to hurt anything here—the atmosphere keeping the heat about the same. I attribute the success of our New Orleans exhibit very much to the manner in which we regulated the changes in taking it from one climate to the other. Grapes kept two or three months; and some of the oranges and lemons were apparently as fresh as ever. I am satisfied that this business will prove a success; and I know, by the manner in which they have put it up, that they have every faith in it.

Mr. Stowe: I would request that a committee be allowed to visit our works, and see for themselves what our system is. There is nothing secret in regard to the system. You can go there and see it working. We will show the whole system, from "A" to "Z," and you can draw your own conclusions.

Dr. Chubb: I agree with Mr. Wilcox that there is a mint of money in this cold storage establishment to the fruit growers of this section, and I seldom take kindly to any method which has the name of process to it. It smacks a little too much of a patent, and I always had a permanent objection to patents, and that has been the trouble with our washes. If it is true that we can keep our fruit indefinitely by this process of cold storage, I should feel that we had nothing to do but to sit down and grasp our wealth. This method is so plain, so simple, and so plausible, that anybody who will spend the time to go and look at it, and notice the results and the conditions as applied, will be convinced that it is a natural process, and that the only wonder is that it has not been stumbled upon years ago. The great trouble which we have met with in transporting fruit has been to transport it in such a condition as not to promote decay. Decay comes from fermentation. If we can place a fruit at a temperature almost freezing, and keep it there, there is very little danger of fermentation taking hold of it. This process cures the fruit at the same time that it prevents the decay, and prepares it at once for transportation. The boxes of fruit are placed in rooms that are dried as dry and more so than the atmosphere outside, and if you will go through the rooms, opened as they will be to you, you will notice all through them pipes, that convey the brine, which are covered with from an eighth to a quarter of an inch of frost. That is a deposit from the moisture in the room, and from the fruit itself. That is the process of curing. If we can take an orange and so far reduce or extract the moisture from the peel that it contracts the pores, an oily substance is, to a certain extent, spread over the entire outer surface, and just so long as that orange remains in that condition so long will it keep as compared with the life of an orange. That is just what this process does. It extracts the moisture from the outer portion of the rind and leaves the oil to spread over the entire outer surface, giving a soft, glossy feeling to the skin, and then it is transported in just that condition any distance and for any length of time reasonable to the life of an orange. There is only one point to be guarded against in taking it from that condition and placing it upon the market, and that is to restore it to the condition of the outer atmosphere so gradually that the coldness of the fruit will not collect moisture on the outside. That, the dealers will learn to do. In this case the agent brought the temperature of the outer house down to the condition of the atmosphere, and the fruit is insured. We all know that if we take an orange from the tree and lay it carefully away on the mantel of the room that it will keep two and three weeks, until it dries up. The condition that is followed out there is followed out by this process.

Mr. Block: An intimation has been made here that Mr. Allegretti's letter was intended to be applied to Riverside. I do not think such was the intention of the gentlemen. It is a well known fact that heretofore the cooling process has been carried to such an extent as to create sweat. I suppose that is what he refers to. I know Mr. Allegretti to be a fair and square gentleman. The gentleman seemed to have something to fear from this being a patent. Although he has procured three patents he has not become a bloated bondholder, I am sorry to say. We have plenty of room here for refrigerators, and everything else that will assist us in marketing our fruits, and we hope that they will all prosper. I have seen strawberries from Mr. Allegretti's method coming out after they had been in two weeks, in the same condition as when they went in. Whether the process is the same in effect as that used here at Riverside, I do not know. Last year he shipped grapes to New York of a variety never before shipped, such, for instance, as the Rose of Peru. The railroad, I believe, got about $1,000 a car for taking them, but he got a very big price for them. He has shipped fruit there that otherwise would not have been sent. If we have a process here that can accomplish the very same thing, I should be happy to know it. I do not wish to undervalue the interest. Of course, the process of ripening fruit is a process of fermentation, and if it can be arrested at any stage of course the fruit will keep.

Dr. Chubb: I have no intention of criticising Mr. Allegretti's process. It was simply the idea of calling it a *process*, as something in the way of a *patent* which was not to be understood by the people at large. I have had experience in some of those matters, and always have suspicions of anything that has any peculiar secret process about it. His process may be more valuable than this. If it is on the same principle, he should call it cold storage and exhibit it as these gentlemen have done. If it is better for strawberries and small fruits than what this would be, I am very glad of it, and hope it will prove just as remunerative to the small fruit growers of the north, as this is likely to be to the orange growers of the south. I do not wish to be understood as taking any exception to the character of the process itself.

Mr. Wilcox: I will be glad to extend my statement a little further. When I visited Mr. Allegretti's process it was only a process; it was not patented. I was the third person who had ever been admitted in the inclosure. About $5,000 worth of fruits—grapes, pears, and peaches—had been put in. He kept the process secret, so that he would not be cheated out of it. My idea was, when visiting the establishment, that the process caused resistance to decomposition. We know that human beings might remain frozen at the north pole without being decomposed, and I thought fruits might do the same. The result is that if it is valuable for fruit it is an important thing, especially if the fruit will keep after it comes out of the establishment. He claims this process will do it. This gentleman objects to the patent. I presume there is a patent on this thing. I would have one if I had anything to do with it. I presume that he will not show the secret of keeping it, and I presume that this process of keeping is not known to the public. If it is open to the public use anybody can have it patented. That is all we have to keep it from appropriation. I would like to have this establishment process some strawberries. It is the most delicate fruit raised. It was suggested by Professor Hilgard, of the State University, that it was the best test that could be made, and the only question in my mind was whether they would keep afterwards longer than if not processed. I took some of those berries home, and we had them in the family three days after taking them out, and they seemed to have the natural taste, flavor, and look at that time. It is very important, because it would double the value of most of our good fruit here to keep it for market, and at times it would add 500 per cent to the value.

Mr. Stowe: I would like to state the result of some experiments made in Santa Ana in October last. On the sixteenth day of October last, we picked and packed a lot of grapes at Santa Ana. Those grapes were shipped to Chicago, and reshipped from there to New York and Boston, by our process as we apply it here. A part of those grapes were eaten in New York on the eleventh day of January, and in Boston on the thirteenth day of January, of this year. That answers in a measure your question as to the keeping qualities of citrus fruits. The same can be done with apples, pears, peaches, apricots, strawberries, etc. I would be glad to process your strawberries, and demonstrate how we handle them. We can handle deciduous fruits just as safely as we can your citrus fruits.

Dr. Kimball: I apprehend that the essential principle of cold storage is the destroying the germs of life, by the application of a steady cold, and by that means destroying all favorable conditions to decay. Like the other gentlemen who spoke, I am inclined to look with disfavor upon all patents and processes which are kept just beyond the reach of the public. Probably, there is but little difference in the principle which is applied under each process, although the manner of application may be different. The steady application of a certain degree of cold so chills the fruit, that it resists the tendency to fermentation and decomposition. I believe that it will prove of more benefit to the central portions of the State in putting our small fruits, and especially our cherries, upon the markets of the East, than it will to Southern California.

Mr. L. M. Holt, of Riverside: Mr. President, the time of the convention has been largely taken up in the discussion of the insect question, which is a very important one, but it is of very little use raising fruits if we cannot sell them after we get them raised. In the first place, we have got to raise them, and in the next place comes the question of how to get them to market in such shape that we may realize a good profit on them. We have given the question of marketable fruits a careful study here, and have come to the conclusion that this is the broadest question now before the people of California. It has been said that this question of cold storage is not essential to citrus fruits. I went to Chicago a year ago, and there I saw carloads of fruits, one half of which were rotten. I went through some of the houses there on South Water Street, where they showed me box after box that had to be repacked. They would, in repacking, put about ten boxes into five. I sent lemons there myself at one time, and only about 25 or 30 per cent was marketed and the rest reported as rotten. Whether it was rotten or not, I do not know. There was probably not as much rotten as reported, but I could not help it. Now, if we had our lemons shipped there by cold storage, we would know that they were in condition to be put upon the market, and they could not be reported as rotten lemons. I believe the same to be true in regard to the orange question. We know that a large percentage of the oranges do rot when sent to the eastern markets. If we can save 5 or 10 per cent of our oranges from rotting, by sending them to the eastern market through cold storage, it will pay us well to do it. Another thing in regard to the orange and lemon question. We all know that lemons ripen a long time before we can place them upon the market. They ripen in the fall, but if put upon the market at that time we would have to compel the eastern people to drink lemonade when the thermometer was forty-five degrees below zero, and that they will not do. We could not put our lemons upon the market heretofore, because we could not keep them in proper condition from December until July. I believe that this cold storage question is going to solve that problem as far as Southern California is concerned. We see in this cold storage, the realization of our hopes for raising and marketing our lemons. We can put our lemons in cold storage in December, and keep them until next July, and then sell them when they will bring good returns. I think that the time of this convention could not be better used than to give this question of cold storage a good, thorough, careful consideration. It is of considerable value to both Southern and Northern California.

We have not been able to ship fruits to the East, because we have not been able to put them upon the market there. We have shipped fruit over these deserts, while the northern part of the State had the better route for summer shipment. Now, if we can put our crops into cold storage we can put them through the desert to the terminal stations, and land them in Chicago in marketable condition, and get good prices for them; and I believe that if we had nothing but the oranges and lemons alone to handle here in Southern California, that cold storage is just what we want for them. I would like to have this convention go to the cold storage works for a day, or a half a day at least, and examine them. They will be well repaid for the time and trouble. They should examine the fruits that have been placed there forty-eight days, and then examine the fruit which has been removed now for two weeks or more. It demonstrates the condition of fruit which has been submitted to the cold storage process. Right here comes in the objection of the fruit men back East, who say: "Do not put your fruit in cold storage, for it will not keep, it decays as soon as it is taken out." This process will show whether that is true or not. I understand from the little study which I have given this question, that there is a right way and a wrong one for putting fruit into and taking it from cold storage. If you take the fruit from the room where it has been kept for weeks at the same temperature, and have the temperature of the room so raised that it will approximate the temperature gradually of the cold storage, it will not decay. I saw this fruit taken out two weeks ago last Monday, and it was in a perfect state of preservation, and the fruit, after being taken out, did not sweat. The paper in which the fruit was wrapped was so dry that it would crackle beneath your fingers. Not a single orange or lemon in those boxes was decayed in the least. It was repacked in my presence, and on Monday it was placed on exhibition here. The fruit did stand up after being open two weeks, and as you see now, is in good condition, and I judge that it will keep for weeks yet. I do not see why this proposition in regard to fruit that is placed in cold storage is not true; that the life of the fruit which has been taken from cold storage is not just as long as the life of the fruit would have been before being placed in the cold storage. These are questions to be proved, but it looks to me as though we were proving them. Experiments made by this company in sending their fruits to Chicago and New York last fall prove this question. The testimony received of scores of people back East, who have used the fruit which has been sent back there after being taken out of cold storage for days and weeks, is evidence upon this point, and I believe that this cold storage question is going to solve the great question here, so far as the profitable culture of fruit is concerned, in Southern California as well as Northern California and the whole Pacific Coast. In Northern California you have cherries and other fruit which we do not raise. Under the old system, if apricots were sent to Chicago they had to be picked green. Under the cold storage system I can see no reason why they should not be allowed to ripen on the trees and put into the cold storage before being sent to the market in Chicago in just as good condition as when they left Southern California.

The usual recess was here taken.

AFTERNOON SESSION.

In calling the meeting to order the President made some remarks regarding the want of interest manifested in Riverside over what, to so large a portion of the State, was a vital question—the scale insect pests. As this question had occupied so much less time than had been expected, and as several of the Board were desirous of examining localities where the subject could be better studied than here, he hoped to close the session here on Thursday instead of the day following, as announced.

A Committee on Memorial to Congress was chosen, composed of Dr. E. Kimball, W. G. Klee, and Jas. H. Roe.

Mr. Blanchard thought cold storage very desirable, and that we ought to study it. He moved the appointment of a committee of five to examine it. The meeting appointed as the committee, L. M. Holt, Dr. O. P. Chubb, I. A. Wilcox, N. W. Blanchard, and W. B. Ewer.

A Committee on Fruit Exhibit was appointed, composed of N. R. Peck, E. W. Holmes, and A. Scott Chapman.

FRUIT PACKAGES.

Essay of G. Tompkins, read by the Secretary: At the Sacramento Convention of the State Board of Horticulture, a committee was appointed to fix uniform sizes for packages for eastern shipment of fruit. This committee consulted all authorities within reach, made a schedule, and reported at the annual meeting of the California Fruit Union. The Directors of the union made one slight change, and then adopted the report. The Secretary of the union, Mr. Fairbanks, has mailed copies of this report to all interested; any one who has not received a copy, can get one from him.

The cherry box is the eastern box of last year, but with sides of one quarter inch lumber instead of three sixteenths of an inch, and with an inside depth of two and one half inches, instead of two and one quarter inches. The sides are in two pieces instead of one; this is for better ventilation. The above changes were made by the advice of several experienced cherry growers and shippers.

In the plum, apricot, and peach boxes, the length and breadth remain the same. The least depth (inside) is four inches, the next four and three eighths inches, then four and seven eighths, five and three eighths, and five and seven eighths. The eighth of an inch taken from the four and one half inch and larger size, is to allow for the waste in cutting. The pear box and the grape crate are unchanged.

The chief reasons for uniformity in packages, are convenience in loading and saving time in selling. This is so well understood, that as one of the committee I ask your help in carrying out the plan of campaign.

On motion of Mr. Block, the essay was read and placed on file, and the report was adopted.

The President: In regard to that, I stated that information ought to be given to newcomers in regard to planting fruit trees, so that they would not make mistakes and become bankrupt. The great point with a great many people in California is the getting of money out of newcomers, no matter what the result may be. I am opposed to that, and suggest that some action be taken which may be deemed proper to give information to those coming to settle in our midst.

Mr. Holmes: I think this is a very important question, and I think more harm is done in the way of mistakes than intentionally. A great many though, after they have been here two or three months, know all that there is to be learned, while there are a great many points which have been undecided by those who have been in the business for a dozen years. I know very little about northern fruits. When I came here, to Riverside, I planted a great variety of fruits. I have been digging them up, one by one, ever since, till I have but very little left here except oranges. Had our first venture in peaches been in the right direction, they would have paid us well, but we evidently did not know what variety to plant. Probably some good varieties of clingstones would have paid, perhaps, a hundred dollars an acre until they became too old to bear. I planted the usual variety of stuff on my place that I wish was not there. I have about twenty-two varieties of oranges and only about two that are deserving of mention as being better than others. I think the tendency will be in the future to an increase of orange orchards and a reduction in price, so that those who do not raise a high grade of fruit will not make very large profits. I believe that in the near future lemons will be largely planted, and I believe that there is no better variety than the Lisbon. We should plant only those which we are sure come from imported trees. There are a great many Lisbons. A friend of mine sent me some very fine lemons a short time since, and stated that he had received $25 for what grew on four trees. They had been kept, perhaps, six weeks. They were thin skinned, fine grained, and strongly acid, but so infernally bitter that no man would ever drink more than one glass of lemonade which was made from them. That is the case with many of our lemons. I think, as Mr. Holt said this morning, that his cold storage promises us a future for the marketing of lemons.

Mr. Block: This is a matter of great importance; at the same time it is almost impossible to give advice. A great many mistakes have been made in this garden as well as the one made by Adam in the Garden of Eden. It is evident that the Garden of Eden was not a suitable place to raise apples. The same thing will apply here, where there are so many different climates. The soil, the climate, and other circumstances have to be taken into consideration before advice can be given. Many who have been here three weeks know more about what to plant than those who have been here twenty years. Men are here to-day who can, perhaps, tell you what will be advantageous to their soil and conditions, but it would be impossible for them to advise you what to do five hundred miles from here. I, myself, would like some information on the subject of what is best to plant, but I do not see how I can get any.

Mr. Wilcox: I think it would be very much easier to tell what not to raise than what to raise in the fruit line. Twenty-nine years ago I planted my first fruit orchard. Apples, at that time, were worth 45 cents a pound by the box. Ten years afterwards I cut down a portion of the trees. Afterwards I concluded that we would not propagate more than thirty varieties of apples. That was about thirty years ago. I started with a hundred varieties of strawberries twenty-five years ago, and to-day I am only cultivating one variety. I do not wish to say that it is the best variety of berry, but it is the best suited to my farm. In the same county, not two miles from my place, they cultivate a number of varieties. Near the bay, where they get a mild sea breeze, they raise the old Longworth berry. I have tried and discarded many varieties, merely because, while they did well at other points, they did not do well with me. The Sharpless is one of the sweetest and largest berries we have. I prefer the Triumph de Gand. It is the only foreign variety that I know of that has succeeded well with me. It is a good idea to raise a fruit that looks well, as they want a showy fruit in San Francisco. If we knew of any certain kind of fruit from which we would be sure to make the most money from, of course, we would all raise that.

Mr. Peck: To illustrate the fact that it is unsafe to give advice, I want to say that, as my friend from San José has recommended the Triumph de Gand as the best, I procured and planted a large supply of them and cultivated them well for three years and then had to dig them up, as they would not fruit well with me.

Mr. Holmes: One of the industries that is becoming prominent is the cultivation of the fig. This section is adapted to the production of very fine figs, although we have not the very best varieties here, as I understand. I have perhaps a dozen varieties, which were set out many years ago, but among them all there is not one that is good for drying. I want to inquire in regard to the fig known as the White Adriatic, and what is its habit of ripening. Does it ripen all in one week, or is it continuous over a period of time? It is very important to consider the length of time.

Mr. Wilcox: I was one of the committee to report on the exhibits at Los Angeles a year ago last November, and they had a fig at that exhibit, exhibited by one of the members of the Board, which was propagated and raised at Fresno, and they raised no objection to it in any respect. That was the White Adriatic. It is a very large fig, a nice, light color. I noticed that they were very nicely put up, and that they asked a very high price for them. They asked high prices for the young trees and considered that there was a great deal of money in them at Fresno, which is a very warm place. I should think it was a very favorable place for the fig.

Mr. Holmes: We are in a situation where we could do well with a fig if we had a variety which would pay to handle.

Mr. Klee: I tried this summer very earnestly to get to some place where this White Adriatic was ripe, but always failed to get there just at the right time. I believe they have two crops at Fresno. I was in that county in the month of August, and at that time they had been taken off about ten days previous. I think that they ripen about the end of July. The great tendency to bearing all the time is common to the black fig. I think there is only one large crop of this fig.

There is another fig that has been thought a great deal of, and that is the Bulletin fig, imported by the San Francisco Bulletin Company, and supposed to be one of the best varieties of Smyrna figs. A fig coming from the Bulletin Company ripened near Penryn this season, and I visited the tree and saw some half ripened specimens of the second crop, but nowhere could I obtain them ripe; but the gentleman who had the trees was formerly with Strong & Company at Sacramento, and ought to have been a pretty good judge of a fig, and he told me that he was satisfied that it was a superior fig and would prove to be a very good drying fig, but that he had neglected to dry them, having so few of them; but that seems to settle the question of whether that fig would bear, which has been very much mooted. It has been here for a number of years, and people have feared that they have not the right variety. Evidently the fig will bear, but we want to see more of it before passing judgment upon it.

Dr. Chubb: The question is not so much the different variety of fruit to recommend, but what kind of fruit to raise in any given locality, so that a newcomer can raise it and make money out of it. Our success as a fruit State depends upon whether we can make fruit raising permanently profitable. There are fruits which we are growing for the eastern markets for which there is a continuous demand, and which we are safe in saying to newcomers, that they can cultivate and get fair returns. For instance, the raisin crop is always going to be a staple crop, and I believe that we are going to be able to control the markets of the Eastern States in competition with foreign crops, to a very large extent, in the near future. The same may be said of our oranges. In regard to lemons we are in the background. I apprehend, however, that the point mentioned this morning of cold storage will have something to do with that, and that when we have the right variety we will not only be able to grow but to market them. We must be able to put the fruit on the market when it is in the greatest demand. We might say in regard to oranges, that any man who has the right kind of soil can grow fine Navel oranges, and always get a fair return. I might name four or five varieties of oranges that can be safely recommended, subject to soil, irrigation, and proper cultivation. The lemons that might be recommended are the Lisbon, the Eureka, and the Sweet Rind, which are grown here in Riverside to some extent.

As to raisins, the Muscat is the most promising variety, and possibly the Sultana will acquire prominence in future.

Then there is the question of prune growing. Prunes are really a staple and can be handled at the East. They can be dried and retained as raisins can, and can be raised, provided the soil, climate, and elevation are right. As to the fig, we have not yet had much experience, and perhaps newcomers had better let it alone until we can get more satisfactory results. So with apricots. There are growers who are giving their entire attention to apricots, and making money at it, not only here, but all through the State, where the conditions are favorable. The same may, possibly, be said of olives. Our worthy President is making money in the manufacturing of olive oil, and there is no doubt but there is a great future for the olive in this State, provided we can get to understand the proper conditions under which to raise it to make it profitable.

Climatic influences enter very largely into the raising of fruit successfully, but in all these various points, we will, it seems to me, come down, in the end, to making specialities, as our friend, Mr. Wilcox, has made of the strawberry crop.

When a man becomes interested in any one kind of fruit sufficiently to pursue the cultivation of it steadily and persistently, he ascertains what is required for its particular growth, and maturing, and curing; he is much more likely to succeed than somebody who simply takes it up because he has heard that it is pretty good and is profitable. So in regard to oranges. There are many who would not be persuaded into growing for market apricots, prunes, or olives, from the fact that they know how to make money in growing oranges. There are those who will make money largely in the next decade in growing lemons in this State. I would suggest that if this convention through this discussion can throw out any hints to those who are entering the business of fruit growing, to ascertain the variety of fruit which is adapted to any particular locality, which they can take up and pursue steadily, until satisfied that it can be made a success, they will be doing all that can be done. My experience has been like that of Mr. Holmes. Last season I took up apples, peaches, plums, and other trees, and replaced them with oranges, for the reason that I could make none of them profitable, where I am making money from the oranges. In the future I may reverse my action and take out my orange trees and set prunes, so we are unable to give definite advice in regard to the proper kinds to plant, but it must be ever a matter of judgment.

Mr. Holmes: There is one variety of fig which has been cultivated here by Mr. Burnham, called the White Ischia, which he has succeeded in making a profit from, of about $200 an acre.

Mr. Wilcox: We have asked Congress to raise the tariff on prunes. They are produced largely by countries which have the cheapest labor in the world, while your oranges are commanding the best prices. The best rule to adopt is to raise what is best suited to your locality.

Mr. Klee: I think this is a very difficult subject to give advice upon. I would say to newcomers to go slow before venturing in any one locality. Spend a time in visiting different orchards, and learn something about the actual profits made, and ascertain which varieties are to be depended upon. If there is any local horticultural society, and there ought to be, attend its meetings, and you will find the experience of great value. Conditions vary in almost every county in this State. I think it will be a good while before the raising of figs will be overdone, but people must learn how to prepare them for market as well as to have a good variety, before it will be safe to expect to rely on such profits as $200 an acre. There are thousands of acres of land that can be planted to figs. Oranges are being tried all over the State, and while they will succeed in a great many portions of the State, the southern portion always will be where they will be grown to the greatest extent, while the greater portion of the deciduous trees will be grown further north. We find in the southern counties that a great many of the deciduous trees have a tendency to die. It seems plain to me that a climate which is adapted to an evergreen tree, cannot be at the same time well adapted to a deciduous tree. A deciduous tree wants rest. The further south you get, the warmer it is, and the less of a winter season. That is not the kind of weather that deciduous trees require. They want some kind of a rest, however climate differs here. You have portions here that are a long way off from the coast. There are valleys in adjoining counties where they have white, hard frosts, where they have found deciduous trees to succeed. Local horticultural societies do a vast amount of good. They can advise people, can organize, meet and express their views, and compare results.

Dr. Chubb: I want to suggest that in localities adapted to the English walnut fair results can be obtained. I know of people in the moist lands south of Los Angeles who would not to-day exchange their walnut orchards for the best orange groves in the State. It is easily grown, free from pests, can be handled easily, is staple, and I believe will attract great attention. The walnuts to which I have referred are well known, and have a reputation in the eastern markets equal to any foreign nuts. There are a great many people coming here from the East who understand the cultivation of small fruits. I believe if such would put out in this vicinity five acres of tomatoes, so as to have them ripe and ready for market about December, and put them upon the eastern markets through this cold storage process, they would have a paying crop. It has been established that in the winter months tomatoes will bring in the East 15 cents a pound, and there is no reason, in my opinion, why they cannot be grown here and ripened at that particular season of the year, and placed on eastern tables, under this system, without any loss. Of course they are a fruit which require careful handling.

The special committee appointed to examine into the question of cold storage, submitted the following report, which was enthusiastically received and heartily indorsed by the convention:

Mr. President and Gentlemen of the State Fruit Growers' Convention: Your committee appointed to examine the question of cold storage and report thereon, beg leave to submit the following:

The time given for the examination of so important a question has been entirely too short, but we have gathered as much information as possible in the time allotted.

The Interocean Cold Storage Company have their works—the only ones of the kind in California, except a small experimental one at Santa Ana, on the depot grounds of the Riverside, Santa Ana, and Los Angeles Railway—in this place, that are reported as costing $40,000.

The works consist of a warehouse divided into several rooms, each of which is constructed with a view to keeping out the heat, and connected therewith is the necessary machinery for the manufacture of ice and the pumping of cold brine through a system of pipes extending overhead in the several apartments of the warehouse.

This system of cooling the atmosphere collects the moisture of the room on the cold pipes in the shape of frost, and thus the room, the atmosphere, and the fruit contained therein are kept perfectly dry.

The process of cooling the atmosphere of these rooms is so systematized, that the thermometer in any given room is kept at a steady degree of temperature for days and weeks at a time without variation.

The cold storage is used for two purposes:

First—To cool the fruit for shipment East; and, Second—For keeping the fruit for weeks at a time before being put upon the market.

For cooling the fruit for market it requires about twenty-four hours, and the warerooms have a capacity of ten carloads of fruit per day.

In one room we found three thousand five hundred boxes of lemons, which have been stored for next summer's use. This fruit has been in cold storage from two to six weeks, and appears to be curing in good shape, and the indications point to the successful keeping of the fruit until next summer, when it will bring the highest price. If the lemons can be successfully kept for six months, so that they can be packed from November to March, and sold in June, July, and August, and the fruit when taken from cold storage will have sufficient life to be placed on the market and consumed without unnecessary decay, the future of lemon culture is assured in California, and this State can in a few years drive all foreign lemons from this country.

Your committee examined the oranges and lemons placed on exhibition in the Pavilion by the cold storage company. This fruit was put into cold storage on the ninth of February last. Forty-eight days thereafter it was taken out and repacked in the presence of disinterested parties, and each orange and lemon was found to be perfectly sound. At the time it was taken from the warehouse it was removed from a temperature of forty-eight degrees to a temperature of seventy, and during the day this was increased to eighty degrees.

This fruit was repacked at that time and kept in an ordinary packing house subject to climatic changes for two weeks, when it was placed on exhibition for the benefit of the State Fruit Growers' Convention.

This fruit we find to be at the present time in a perfect state of preservation, and from its appearance we should judge it would keep yet as many days from the time of being taken out of cold storage as it would have kept from the time of being picked if it had never been put in cold storage.

The attention of the committee was also called to some Malta Blood oranges which had been in cold storage for over two months prior to being taken out three days ago for exhibition purposes. These oranges showed a deep blood-red pulp and rind in excess of anything of the kind ever seen by us before on this coast. It is a well known fact that the blood-red appearance of this orange only makes its appearance as the fruit ripens and matures. This deep blood-red appearance of this fruit is therefore evidence that under these cold storage conditions this fruit has ripened and matured in a degree not possible under other circumstances.

The Riverside Washington Navel oranges taken from the cold storage exhibit, having been forty-eight days in cold storage and seventeen days out, show a solid appearance, a tender and juicy pulp, and fine flavor, unsurpassed by any fruit of the kind kept under other conditions.

The committee were shown letters from various prominent fruit houses in Chicago, and other eastern cities, showing that fruit shipped East from Riverside this season under the cold storage process had come to hand in excellent condition, and urging that fruit growers and shippers avail themselves of this system as a means of guaranteeing the safe arrival of their fruit at the point of destination in good merchantable condition.

If this system of cold storage will do what is claimed for it—and under all known rules of evidence your committee is forced to the belief that it will—the advantages to be derived therefrom are not confined to citrus fruits, but perhaps its greatest benefits are to be found in its application to the shipment of more perishable fruits, such as grapes, apricots, peaches, pears, the small fruits, and winter vegetables.

The field of practical operations in this line is virtually unlimited. When the risk of shipment is reduced to the minimum, a small margin of profit will satisfy dealers, the producer will get a good price, and the consumer will still get his luxuries at a fair figure, and the consumption will be increased many fold, still further increasing the profits of our California fruit growers and gardeners.

Cold storage will, in our opinion, revolutionize the fruit industry of the Pacific Coast. It will enable the producer to ship his fruit by slow freight at $200 a car, instead of paying $500 a car for express time. Here is a saving of $300 a car, less cost of treatment. It will reduce the risk of shipment, thus enabling the selling of fruit at a lower figure to the eastern consumer, and it will thus place choice California fruits within the reach of the eastern masses instead of the wealthy few.

It is claimed by the cold storage company that the success of the system depends upon its intelligent use; that if the fruits are kept in too cold a temperature the system will fail. If the fruit on removal from cold storage is taken out when at a too low temperature the fruit will sweat, and decay will follow. Before the removal of fruit from cold storage to a warmer outside temperature such fruit must be prepared for removal by raising its temperature to a certain point to prevent sweating. The failure to understand and apply this principle may have been the cause of the failure of cold storage in some cases to give satisfaction.

The cost of cooling citrus fruits for market is at present $60 per car. The fruit is shipped in the Tiffany refrigerator car, which is iced to keep a uniform temperature while in transit over desert and mountains. These cars are so constructed that they will pass through winter blizzards without a material lessening of the inside temperature. On arrival of fruit at place of destination it can be placed in cold storage warehouses and kept until the market calls for it, or it can be marketed at once.

We commend the system to the careful consideration of the fruit growers of the State.

L. M. HOLT.
O. P. CHUBB.
NATHAN W. BLANCHARD.
I. A. WILCOX.
W. B. EWER.

THE PRESIDENT: Before calling for the report of the Committee on Fruits, I will state that I have a letter in my hands from Matthew Cooke, which seems to have been sent to another gentleman and kept in his pocket. It was mislaid, having been mailed to me. He regrets that his health would not permit him to be present at this convention to-day.

FRUIT COMMITTEE'S REPORT.

The Committee on Exhibit of Fruit beg leave to report:

That the people of Riverside deserve the thanks of this convention for their very creditable display of fruits and raisins, giving evidence to the people of the State that they are free from the scale pests which are so detrimental in all other parts of the State. Their oranges are peculiarly clean and beautiful in appearance, and unequaled in flavor, and command the attention and admiration of every one.

The exhibit of the Interocean Cold Storage Company demonstrates that fruit will not "go down" when taken from their rooms, and that, on the contrary, oranges that have been so kept for a month, show a thinner skin and deeper color. Would commend this process to the attention of every fruit grower. It appears that with this method the lemon industry of the country may be wonderfully increased, for, being a fruit which matures in the early part of the winter, it furnishes a sure way of keeping the fruit until it shall be called for at enhanced figures in the summer.

N. W. Blanchard, of Ventura County, also makes a display of oranges and lemons, which deserves honorable mention.

N. R. PECK,
E. W. HOLMES,
A. SCOTT CHAPMAN,
Committee.

On motion of Mr. Block, report received and approved.

Mr. Holt: I feel that there is probably an explanation due to the members of this convention, in justice to those who have come from a distance, and in justice to the people of Riverside. I do not make it in the way of an apology, but I wish to call attention to some facts which will show why there has not been a larger attendance of the fruit growers here at this convention. You all know, probably, or if you read the papers carefully you will find out, that there is at the present time in Southern California, a very active real estate market. The people of Southern California have, to a certain extent, got "real estate on the brain." I doubt if there is any one place in Southern California to-day, where this convention could call forth any good sized audience to attend on its deliberations. To-day, if in the City of Los Angeles, you could not get any great number of fruit growers to turn their attention aside from the work they have in hand (the dollars and cents part of it), to the discussion of the fruit question, which they can take up and handle at some other time, when there is not any real estate in which to deal. The same reasoning will apply to all parts of Southern California, and it is unfortunate that the convention should be held in Southern California at a time when the attention has been taken up in another direction.

Another proposition is this: The fruit growers of Riverside have given a great deal of careful thought and attention to questions of this kind. Seven years ago Riverside was working to find out how to make their money out of fruit culture. For five years after that time it was only necessary to announce a public meeting here for a discussion of fruit questions, not only to call out all the fruit growers, but also the women and children. We have had a great many meetings in this valley when the house was crowded by people who wished to learn everything that was to be learned upon these subjects. They have gone through that before, and when you go to work and announce a convention, and announce as one of the main questions the discussion of insect pests, to occupy a large portion of the time of the convention, our people do not care to enter. They take no interest in it, because they have no insect pests. I doubt if one man out of ten in this valley can tell the difference between a cottony cushion scale and a ladybug, unless they happen to be acquainted with the ladybug. They have never seen these pests. While they have done a good deal of work in the way of keeping out pests, they have paid but little attention to washes and preventives—hence they have had no experience in that direction. These are the reasons why this convention has not called out a larger attendance from the Riverside people, and I feel that it is due our people, as well as those who have come here, to mention these facts. Another reason is that the death of a prominent person in the valley has taken away the attention of a large number of people who would otherwise have taken some interest in this convention. All of these things should be stated as an explanation to those whom, as I said, have come from a distance, as to why our people have not taken a greater interest in this convention.

Mr. Lelong: I wish to say also that much is due to Mr. Holt, who has advertised this convention from time to time. I have been around considerable and have met a great many of the fruit growers, and I think the convention can thank him for much of the attendance here.

Dr. Kimball: I have been highly gratified, in common, I think, with the members of this convention, in seeing the beauties of this place where fruit culture has been carried on with such evident success, under such conditions and circumstances, that it seems as though the people of this beautiful valley had settled down into that happy Rip Van Winkle kind of an existence, that no such extremes as real estate could distract their attention from the beautiful pursuits in which they were engaged, and yet, if they will come up to the northern part of the State at some future time, we will show them that happy equilibrium and unanimity where all these things are blended harmoniously together, where the real estate mania has not run away with our common sense, and especially with our ideas of the beautiful.

Mr. Wilcox: I feel like saying to our Riverside friends that our next meeting will, probably, be in the northern part of the State, and perhaps by that time we will find the boom there. I want to say to these southern folks to come up and help us out with our meetings, hoping that the same cause will produce the same effects.

The President: The bulletin, No. 4, of the State Fruit Inspector is here, and if any one desires a copy of it they can get it at the table. There is now only one more question on the programme. We have passed over all the subdivisions with the exception of the preparation to be made for the next fruit growers' convention, which is to be held in the State some time in the month of November. It has been usual heretofore, or at least it was in the case of the convention held at Los Angeles, to name a certain number of essayists to prepare essays for the next convention. Also, to take some action as regards the time and place of holding the convention. This matter is now in order before the convention.

Mr. Holt: I move that the time and place of holding the next convention be referred to the State Board of Horticulture for their decision; they can tell a great deal better than we can here at the present time.

Mr. Wilcox: I believe that is their privilege any way.

The President: Yes; it is only asked for suggestions.

Mr. Wilcox: I wish to say that if the Board sees fit to come to our county, we will endeavor to give them a place, and perhaps a good attendance. I name this because it is a suitable place, and one of the conventions has been held there; it is a thickly settled place and will always call out a fair meeting.

General Vallejo: Mr. President, I am about the only representative of the northern part of the State. I came down from Sonoma County, six hundred miles, to ask if it was true that there was such a place as Riverside, and to compare it with what it was at the time when I formerly knew it.

But before I go into the historical reference to Riverside, I move that the next convention be held at Santa Rosa, the county seat of Sonoma County. Santa Rosa is not a larger place than the beautiful vale of roses that Mr. Wilcox spoke of; but I know Santa Clara Valley. I knew it before he was born. It is beautiful, and has most everything that is excellent. I was there in the first settlement of the Santa Clara Valley. At least, I was there sixty-five years ago. It was at that time filled with forests of timber—redwood and oak, laurel and ash. Its soil was rich, and its climate good.

After that I was sent up to the north, by the Bay of San Francisco, where we were not so well fixed. I tell you, Mr. President, we have a nice country—a good country—up there; and Santa Rosa is ready to receive not only the convention, but the whole of the State. If, as has been stated, the Board has power to fix the place of meeting, I hope, Mr. Wilcox, you and I and the whole convention will agree to hold the next one at Santa Rosa.

Now, sir, coming to the scratch, as you say in English—I have to ask the ladies and gentlemen to excuse my broken English, for I have to talk in my own way—the first time I came to this part of the country I knew no Riverside. At that time—sixty years ago (1823)—it looked different. This is a sort of Arabian Nights business. [Laughter.] I was then about twenty years of age; was with Father Boscano, with a military force going round to Jurupa Valley. I didn't know what Riverside meant then; didn't know the words "river" or "side" at that time. We went to meet an Indian chief—San Jacinto. I don't know but you call him by some Riverside name now. But according to my recollection it was about here [pointing in the direction of the San Jacinto Valley]. There was a large tribe here; and Father Boscano went with a whole military company, commanded by a man named Francisco Maria Rosas, to San Diego. Well, let's see. There is '23, '33, '43, '53, '63, '73, and '83—well, nearly a hundred years ago. I was there. [Laughter and applause.] Now, in the company, at that time, was a man by the name of Nuestro Amo Pepe, a sort of a fancy man—a poet—and he composed a little verse about the country:

Monterey—gloria escondido
  (Monterey—hidden glory);
La Canal—segundo cielo
  (Santa Barbara—second heaven);
San Diego es el purgatorio
  (San Diego is the purgatory);
Y San Francisco el infierno
  (And San Francisco is hell).

This was written in 1776. Now all these little things were in my mind when I came here the other day, and I have been comparing them ever since with what they were seventy or eighty years ago. My father came to this place then; and although I would not say it was purgatory at that time, I would say it was very near it. [Laughter.] At that time the country here was all rocks and thorns; and now the Riverside which I see is not the Riverside of sixty years ago—a purgatory; but I find it very nearly heaven here, with this very happy people.

During my life I have been all over this country and Mexico, and have seen their valleys full of orange and lemon orchards; but never have I ever seen anything like this Riverside, and its most happy people here.

And I tell you, Mr. President—and I speak not lightly—that I believe the Yankee people are capable of turning purgatory into heaven. [Long applause and laughter.] When I go home and meet my wife—*she* is one of those people that turn purgatory into heaven—I shall tell her about it. She is seventy years of age; but not very old either. She said to me when I left: "Now, take me with you. I would like to see Riverside, and breathe its atmosphere." When I get home I will tell her about these orange groves, and how I came among them by railroad. I expect some of these days we'll be going by telegraph or telephone. [Laughter.]

In conclusion, I have to say to these Riverside folks that I give them my wishes for their happiness and prosperity, and hope that the next time I come here—I don't know—I think I ask you to pray that age may be turned into youth. I think the energy of these people is most wonderful. When Captain Sayward came here I told him about all the waterworks of Mexico and Spain, and asked him what he was going to do with the country down here, and he said he would "fix it." And now I have to congratulate the Riverside people, with all the fullness of my heart. When I came here I found your oranges red and yellow, and I told a friend that I think you have some trick to graft the pumpkin on the orange, they are so big. [Laughter.]

Mr. President, if the next convention shall meet in Sonoma County, I promise to receive you and all the Board.

THE PRESIDENT: There is no question now before the house excepting the naming of essayists.

MR. BLOCK: I would suggest that this matter be left to the Board. It is too early in the day to propose essayists for the next six months ahead. Circumstances are such that in the future we cannot tell what is best, and I, for one, would sooner leave it to the President, or the Board, as things may occur during the shipping season that may suggest something proper, and important.

MR. HOLT: I think the suggestion a good one. I think if you go to work just before the meeting, and get up a good programme, and make it in accordance with the place where you are going to hold the convention, that questions may be discussed which you want to make prominent in the convention, and it may be that by the time of the next convention, the questions which seem of importance at this time, may then be settled. If you get up a programme a month before the meeting, you can take into consideration the condition of affairs at that time, so as to make your convention a live one.

MR. BLOCK: Inasmuch as we are very near the close, and as I do not know whether there has been a committee appointed by the citizens of Riverside or not, but I do know that Mr. Holt is a gentleman who has given a great deal of attention to us since we have been here, and if there has been a committee appointed, I would suggest that he be included. If not, I move that the thanks of the convention be tendered to Mr. Holt for the efforts and attention which he has given to this convention, and the members of this Board. I do not mean any disrespect to any other members of a committee.

MR. LELONG: Mr. President, I rise to second that motion. I believe as I stated before, that Mr. Holt has merited the thanks of this convention. He has been in constant attendance, and trying to open this thing up. I have done work with him for the last six weeks, and I assure you that if people have failed to put in their appearance, it has not been his fault. He has done all he could to make this convention a success.

Motion prevailed.

MR. BLOCK: In making a separate motion of this kind, I did not mean any disrespect to any gentleman, and I will now make the same motion in reference to Mr. Lelong, as Mr. Lelong has had quite a correspondence in connection with this convention, and he has certainly devoted a great deal of time and attention to it.

Motion seconded by Dr. Kimball.

Motion prevailed.

Mr. Deere: Mr. President, being a resident of Riverside, and interested in its good name, I wish to supplement what Mr. Holt has said in the way of accounting for our lack of interest on the part of the people here. In the first place, there is a lack of interest in the topic, and I would recommend that when you choose a locality for your meeting, you select some topics in which the people of that locality are directly interested. Some questions that they want settled, and, in settling those questions for them, you settle them for the whole State. Another point that Mr. Holt (to my surprise) did not mention, is the weather. I have had a great deal of experience with the Riverside people. I know their temper in regard to assembling, and I know that it is almost impossible to get a fair representation from this place, except when the sun is shining, and everything is clear, and there is no possibility that a drop of rain will fall upon anybody. I never saw a city in my life so afraid of a little wind or rain, as they are here. When it comes Sunday morning, if I can see a cloud anywhere, I expect a small congregation. I know it is cut down. If a slight breath of wind comes from the north, I know it will cut it down. I can tell by looking at the sky just about what congregation I shall have, and it must be a peculiarly strong attraction which will bring people out when it rains here, as it has since this convention began. I never saw anything like it. There is scarcely an umbrella in town or a pair of rubbers. We don't need them—they are not required in our beautiful, clear, regular, Riverside weather. That is one of the reasons for the lack of attendance on this convention.

Mr. Holt: I came very near remarking that this was very unusual weather here, but I was afraid somebody would take exception, and I didn't do it; but, I will remark in that connection, that the fruit business is carried on for the money in it, and not for fun, though there is a good deal of fun in it, and Riverside has managed to get there. We have a thousand acres of vineyard here, which will net the owners from $100 to $150 an acre. We have orange groves which will net from $100 to $1,000 an acre, and I believe there is an orchard in this valley where the crop has just sold for a little over $1,000 an acre, if I am correctly informed. We have got to that point where we can sell oranges on the tree for $2 80 a box for seedlings, and $4 50 and $5 a box for Navels; and our people are pretty well satisfied, from a financial standpoint; and as regards insect pests, which they do not have, they are rather inclined to take the matter easy, and not worry themselves about that point.

Mr. Wilcox: There is one matter which occurs to me in regard to these conventions, and that is the information to be gained from conversation. I may say that I generally gained about as much information at these meetings from outside conversation as from the remarks of the public speakers.

Dr. Kimball: It seems to me a settled point by the convention that the next convention is to be held somewhere in the north—probably around the Bay of San Francisco. I would extend a hearty invitation to the whole people of Southern California, and to the people of Riverside particularly, that they may be able to test somewhat the diversity of climates of the State. We have enjoyed your remarkable show, your sunny skies, the appearance of your orange groves, the visions of beauty, your fine roads and walks, and it is not to be doubted that you have enviable possessions; but, notwithstanding your varieties, you do not comprise quite all the world, and especially the whole State of California, because around the Bay of San Francisco, and in the nooks and valleys that are to be found there, many are as susceptible of fine and remarkable cultivation as there is in the State, and I would say to the people of Riverside particularly if they will come up to Santa Clara or to my adopted county, Alameda, we can show them, if not all varieties, something approximating it, and where we have sunny skies, as well as rain, during all portions of the year.

Mr. Block: It is very true that we are learning. I, for one, have learned since I came here a number of things which are new to me. I must say that I congratulate the people of Riverside at the evident prosperity, at the few idlers that I see around here, and, evidently, they are not in this city. If they come to our section, or to the section to which the doctor refers, they can find a great many more liquor saloons than grocery stores. I see that you are rid of that pest, and that is one of the matters upon which you are to be congratulated. It is a pest that breeds idleness and discontent between the working man and his employer. There is where the working man claims that injustice is done him; but the only thing which has done him injustice is the saloon, which has put its hand in his pocket continually. You don't know how happy you people should be from being rid of that pest, among others, to contend with. I was surprised at the expression made by the reverend gentleman here, that the people of Riverside were afraid of water. No later than last night I complimented them on the use of water, to which they have habituated themselves. His expression is a new revelation to me. There is some contradiction which I would like to be enlightened on. As it is, I am, nevertheless, very well satisfied and very much pleased to have met with you, and, although I have to go a good ways, I have got something to take home with me.

Mr. Holt: Inasmuch as the people who have come from the northern part of the State have furnished us with remedies for the pests which they have tried, it would not, perhaps, be out of place to suggest a remedy for this other pest. We have a saloon license in this town of $500 a quarter, and that is our remedy for that pest; and on top of that they have a county license of $75 a quarter, which compels our only saloon which we have here to pay $2,300 a year for the privilege of existence.

Mr. Wilcox: I believe I will add another word. Gentlemen here have asked something about fruits, and reference has been made to other varieties which we have been cultivating. The way to learn and to improve is to come where we have these things. It is for that purpose I have come down here among these orange groves, and had a taste of the orange blossoms and fruit; but I would suggest that Santa Clara is thirty or forty miles long. In the thermal belt of that valley we might have oranges; but we have not the water that you have here running along, and may never utilize the ground. We took the premium at the Sacramento Citrus Fair for our limes. If you want to see our prunes and pears, come where they are. Mr. Block is a little modest, but he has about a hundred acres of pears in full blossom, and if you will go there you will see a perfect bouquet of white blossoms along with fruit. In my neighborhood, for miles and miles, you will see strawberries in blossom, green, and ripening. You will see long rows that we irrigate. Our water comes from the ground from artesian wells. We wouldn't like to do without it. It has well repaid me in coming down here, although I never raised an orange in my life. I have learned something about the shipping of fruits, and propose to learn something about the soil and products of the country, etc. I will add, that in our valley we raise nearly everything that is raised.

Mr. Block: I move that we adjourn.

General Vallejo: I rise to lead you in three cheers for the Riverside people.

They were given, the motion to adjourn prevailed, and the convention adjourned sine die.

THE FRUIT CROP OF CALIFORNIA FOR THE PAST SIX YEARS.

There is no branch of the fruit business on the coast that has grown so fast as the raisin industry. The following figures show the increase during the past six years:

Year.	Boxes.	Pounds.
1881	90,000	1,800,000
1882	115,000	2,300,000
1883	125,000	2,500,000
1884	175,000	3,500,000
1885	475,000	9,500,000
1886	703,000	14,060,000

Turning to the orchards, we find it estimated that there were, at the end of last season, eight million fruit trees in California, the net value of which it is not possible to estimate. The fruit crop of 1886 was not the largest known in the State, but it was a very large one, nevertheless, and one of the most profitable had in the State. The dried fruits brought good prices; much higher than a year before. There were good prices, also, for the fruit sold to canneries, and most of that shipped East did well. There was much more shipped East than in any other year in the history of the trade.

Following are the figures:

	Pounds.
Sacramento	18,954,980
San José	2,211,120
San Francisco	527,813
Los Angeles	209,230
Stockton	203,600
Colton	84,600
Marysville	60,000
Oakland	43,250
Total	22,294,593

The shipments of oranges were:

	Pounds.
Los Angeles	21,513,880
Colton	4,267,850
Sacramento	81,300
San Francisco	43,800
Total	25,906,830

	Pounds.
Raisins (703,000 twenty-pound boxes)	14,060,000
French prunes	2,000,000
German prunes	125,000
Apples, sun-dried	300.000
Peaches, sun-dried	750,000
Plums, sun-dried	500,000
Pears, sun-dried	50,000
Grapes, sun-dried	175,000
Apricots, sun-dried	150,000
Nectarines, sun-dried	30,000
Apples, evaporated	500,000
Apricots, evaporated and bleached	450,000
Peaches, evaporated and peeled	100,000
Peaches, evaporated and unpeeled	200,000
Plums, evaporated	85,000
Nectarines, evaporated	25,000
Walnuts	750,000
Almonds	600,000
Peanuts	275,000

Compared with the figures of last year's output this shows an increase of four million five hundred thousand pounds of rasins, six hundred thousand pounds of prunes, and a smaller increase in several other items.

The product of canned fruits in 1886 is estimated for the coast as follows: Table fruits, two and a half-pound cans, six hundred thousand cases, two dozen each; gallons, four thousand four hundred and twenty cases, one dozen each; pie fruits, two and a half-pound cans, twenty-two thousand five hundred cases, two dozen each; gallons, thirty-three thousand, cases, one dozen each. This makes a total of six hundred and fifty-nine thousand nine hundred and fifty cases of fruits. Allowing an average of forty-five pounds of fruits to a case, the pack amounts to twenty-nine million six hundred and ninety-seven thousand seven hundred and fifty pounds. Some idea of the increase in the pack may be gained from the following figures, showing the output, in cases, in the three leading fruits during the last three years:

	1884.	1885.	1886.
Apricots	85,000	110,000	200,000
Peaches	60,000	70,000	130,000
Pears	55,000	78,000	120,000

CALIFORNIA DRIED FRUITS.

The following gives the production of last year in comparison with 1885, 1884, and 1883:

	1886. Pounds.	1885. Pounds.	1884. Pounds.	1883. Pounds.
Raisins	15,000,000	9,400,000	3,500,000	2,500,000
French prunes	2,150,000	1,400,000	1,524,000	250,000
German prunes	125,000	150,000	350,000	....
Apples, sun-dried	300,000	1,073,000	1,200,000	800,000
Peaches, sun-dried	750,000	1,500,000	500,000	500,000
Plums, sun-dried	500,000	1,020,000	700,000	100,000
Pears, sun-dried	50,000	100,000	75,000	75,000
Grapes, sun-dried	175,000	175,000	150,000	125,000
Apricots, sun-dried	150,000	300,000	100,000	300,000
Nectarines, sun-dried	30,000	30,000	10,000	20,000
Figs, sun-dried	150,000	100,000	50,000	60,000
Apples, evaporated	500,000	750,000	400,000	250,000
Apricots, evaporated	450,000	350,000	100,000	90,000
Peaches, eaporated peeled	100,000	150,000	50,000	....
Peaches, evaporated unpeeled	200,000	250,000	80,000	....
Plums, evaporated	85,000	118,000	75,000	....
Nectarines, evaporated	25,000	50,000	10,000	....
Totals	20,745,000	16,766,000	8,874,000	5,070,000

Raisins show a most remarkable increase, as do French prunes. Apples, plums, and peaches show a large falling off; but apricots hold their own, while figs show an increase. The large demand, both home and shipping to the East, for green fruits particularly, in the months of May, June, July, and August, caused horticulturists to sell, and not dry the fruits. There was shipped to the distribution centers east of the Rocky Mountains all of 100 per cent more green fruits than were sent in 1885. While there was an increased shipment, there was also a larger purchasing of several varieties by canners. Besides, the crops of apricots, apples, and peaches were light, particularly that of peaches. The season was entered with the market cleaned up, and ready buyers in the field at an advance for the more choice dried, marketed in attractive packages. The East, which had taken everything in this State in the shape of dried fruits, owing to the low overland freights, was also bare of stocks; but at first held back, owing to the advanced views of holders on this coast. As the season advanced, eastern buyers took more kindly to the situation, and paid quite freely the full figures asked. Soon the demand became more marked, resulting in the market being cleaned up at an earlier date than was the season of 1885–86, and at prices showing an average advance of more than 100 per cent.

Last year's production was better handled, and sent to the market in much better condition and style than was ever before done. This improvement in the drying and handling had a most marked effect for the better, and not only aided in their being placed more advantageously, but has built up a reputation for California dried fruits second to none, while in some respects superior, particularly the French prunes and peaches.

The incoming dried fruit crop will come in on a bare and hungry market, both on this coast and at the East. All eastern advices report that the distribution the past winter and spring was on a more extended scale than ever before known, and what is equally as worthy of special note is that all went into consumption. This year's crop will probably exceed last year's, owing to the high prices obtained for all varieties dried in 1886. It is impossible to give the number of new driers sold to be used, but it is claimed that there will be all of 25 per cent more in use than there was last year. Regarding future prices, it is difficult to say, but this is safe to state, that all advices from the East are to the effect that they can handle with fair profit to driers all the fruit that can be dried on this coast, provided care is used in drying, handling, and packing it for market.

DRIED FRUITS.

EXPORTS AND IMPORTS OF THE UNITED STATES FOR THE ELEVEN MONTHS ENDING JUNE 1, 1887, AND THE CORRESPONDING PERIOD OF 1886.

KIND OF FRUIT.	1887. Pounds.	1886. Pounds.
Figs	8,723,137	7,218,290
Prunes	90,697,169	64,008,596
Raisins	40,388,273	39,995,725
	Values.	Values.
Figs	$487,557	$505,038
Prunes	2,971,040	1,998,705
Raisins	2,269,456	2,861,619
Preserved fruits	658,706	797,852
Totals	$6,386,759	$6,163,214

The importation of semi-tropical fruits and grapes also reach interesting figures, as follows:

KIND OF FRUIT.	1887. Values.	1886. Values.
Lemons	$3,286,639	$2,182,191
Oranges	2,104,643	1,768,971
Other fruits (not bananas)	1,758,065	1,386,688
Nuts—almonds	517,934	640,186
All other nuts	663,386	550,615
Totals	$8,330,667	$6,528,651

The weight of almonds was four million five hundred and forty-seven thousand six hundred and eighty-three pounds in 1887, and eight million seven hundred and seventy thousand eight hundred and thirty-six pounds in 1886.

SCHEDULE SHOWING NUMBER OF TREES GROWING IN 1886.

Furnished through the kindness of Hon. E. W. Maslin, Secretary State Board of Equalization.

Counties.	Lemon.	Orange.	Olive.	Apple.	Pear.	Peach.
Alameda*	466	1,689	3,106	101,847	99,149	66,742
Alpine				630	43	17
Amador	25			22,225	3,743	20,330
Butte	728	6,934	3,680	20,848	15,654	29,423
Calaveras	50	500	35	400,000	110,000	525,000
Colusa	38	319	79	7,924	8,208	13,682
Contra Costa†		36	452	2,419	12,289	3,514
Del Norte				6,000	160	104
El Dorado	20	94		60,042	30,839	111,277
Fresno	17	345	55	11,295	35,203	76,116
Humboldt				27,435	2,339	2,239
Inyo				2,306	1,200	1,850
Kern	225	360		14,430	850	27,380
Lake		75	800	20,800	5,900	15,400
Lassen				1,050	100	100
Los Angeles	55,620	729,865	4,520	82,950	26,480	47,010
Marin		80		25,318	2,753	818
Mariposa	3	14	2	1,331	821	877
Mendocino				14,500	6,000	3,000
Merced	127	159	474	5,301	4,815	15,095
Modoc				4,075	246	252
Mono				20		
Monterey		50		4,700	1,900	450
Napa	122	780	8,559	39,708	35,328	54,966
Nevada		25	12	43,200	7,200	7,100
Placer	497	7,313	4,390	37,671	45,765	148,001
Plumas		3		9,693	556	390
Sacramento	138	989	210	24,989	95,075	288,378
San Benito		7	8	41,870	4,860	5,422
San Bernardino	7,845	214,531	1,150	5,840	29,345	454,370
San Diego	1,208	5,773	5,571	12,566	7,849	4,398
San Joaquin	10	931	113	5,854	10,240	16,990
San Luis Obispo	200	350	580	31,500	5,075	8,500
San Mateo				6,000	2,500	2,000
Santa Barbara	3,481	4,864	10,379	15,492	1,580	4,760
Santa Clara	207	1,623	9,654	89,690	123,795	146,445
Santa Cruz				94,350	20,500	11,450
Shasta	26	52	64	9,352	3,840	23,026
Sierra				1,985	289	254
Siskiyou				39,122	2,210	7,348
Solano	9	825	224	59,310	65,794	106,482
Sonoma	1,123	1,317	8,829	196,123	145,216	98,600
Stanislaus	75	872	20	4,506	3,837	12,564
Sutter	83	708	18	6,747	16,297	57,613
Tehama	153	509	175	18,901	10,373	69,120
Trinity				7,430	1,279	1,556
Tulare	94	382	130	31,169	35,691	90,915
Tuolumne				300	100	500
Ventura	200	500	150	700	250	500
Yolo	51	282	37	1,772	30,652	32,058
Yuba	31	267	3	58,572	3,085	3,591
Totals	72,872	983,423	63,479	1,731,858	1,077,273	3,617,973

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* No orchard in Alameda Township, and Assessor of Murray Township makes no report.

† By W. B. Halliday, Martinez.

SCHEDULE SHOWING NUMBER OF TREES GROWING IN 1886—Continued.

COUNTIES.	Quince.	Fig.	Prune.	Plum.	Cherry.	Apricot.	Nectarine.
Alameda*	3,375	1,915	37,285	38,574	104,933	118,623	336
Alpine			2	105	14	5	
Amador	300	550	3,500	12,300	300	1,525	125
Butte	662	2,998	7,843	10,327	4,451	10,680	1,660
Calaveras	2,300	20,000	800	46,620	5,000	2,000	900
Colusa	422	2,621	4,797	3,476	1,268	8,462	1,363
Contra Costa†	107	138	10,612	1,740	1,788	5,078	36
Del Norte	20	175	450	127			
El Dorado	391	927	6,228	27,446	2,210	818	4,444
Fresno	2,406	4,746	7,698	5,348	1,194	44,133	21,629
Humboldt	136	59		6,087	1,670		
Inyo	25	25	300	500	150	360	25
Kern		860		5,724		3,280	1,856
Lake	300	350	20,000	5,800	1,350	1,610	500
Lassen				260	250	100	
Los Angeles	3,675	4,765		13,450		15,175	
Marin	298	42		1,799	545	2,650	
Mariposa	21	275	115	293	69	105	68
Mendocino	500	60	5,000	5,000	2,000	1,000	500
Merced	1,221	1,414	2,120	1,164	936	2,462	881
Modoc	45		86	329	167	65	
Monterey	40	20	900	1.100	1,200	600	30
Napa	3,243	1,321	50,824	16,750	18,694	7,489	1,050
Nevada	917	812	223	35,170	1,125	260	120
Placer	1,932	4,475	13,040	11,893	13,643	6,640	2,919
Plumas	37	1		574	228		
Sacramento	1,249	2,275	30,311	51,110	10,371	13,515	510
San Benito		35	14,480	12,120	2,460	11,986	
San Bernardino	213	1,927	2,345	816	535	293,450	6,450
San Diego	733	3,719	2,317	986	1,442	7,572	337
San Joaquin	531	1,480	1,083	1,172	4,951	15,768	219
San Luis Obispo	500	1,100	24,565	12,150	350	9,100	500
San Mateo	250	200	800	1,000	1,000	700	200
Santa Barbara	471	714	4,119	2.120	260	10,121	432
Santa Clara	3,320	795	616,400	83,980	89,505	399,745	905
Santa Cruz	700	250	17,500	6,300	11,000	9,000	
Shasta	235	1,410	6,041	3,279	1,130	2,680	710
Sierra	58			126	162		
Siskiyou	60		564	3,260	3,374	376	586
Solano	1,226	4,954	28,650	26,962	17,044	120,831	165
Sonoma	13,000	11,300	89,165	12,412	12,706	13,120	11,500
Stanislaus	142	1,031	2,716	2,618	630	6,408	418
Sutter	456	2,073	10,222	9,010	2,291	18,269	2,973
Tehama	780	3,996	18,128	11,897	6,638	12,324	2,499
Trinity	63			1,241	623	39	21
Tulare	1,016	4,032	18,198	9,265	1,068	34,652	11,807
Tuolumne			20	200	50	25	
Ventura	75	40	1,000	5,000	100	3,000	100
Yolo	85	8,966	5,896	5,345	440	20,822	1,129
Yuba	576	448	1,500	2,732	1,000	3,200	2,530
Totals	48,192	991,176	1,077,843	516,057	332,325	1,235,823	82,433

* No orchard in Alameda Township, and Assessor of Murray Township makes no report.

† By W. B. Halliday, Martinez.

A MEMOIR ON OLIVE GROWING.

Read before the State Horticultural Society, by F. Pohndorff.

THE DIFFERENT VARIETIES OF OLIVE TREES.

1. The botanical divisions in tribes, species, and subspecies, we may pass over for our practical purpose. Linné, named out of thirteen species, one family, the European olive tree (*Olea Europea*). This is the tree that interests us.

2. I find the aggroupations of Italian, Spanish, and French botanists, as well as the nomenclatures, chiefly given from local habits by the practical growers in different countries, too complicated to serve our purpose. Without entering upon the value of the different classifications, which may be guiding for the specialist, I am of opinion that no better, simpler nomenclature is adapted to our wants than that in vogue in Spain, and adopted by Don José de Hidalgo Tablada, who, in his practical way, calls the chief varieties he has scientifically and practically handled for many years, by names every one has become familar with, and by which they can easily be identified.

3. It will seem important that from the beginning we should become conversant with the different varieties and accustomed to identify each by one name. This will prevent confusions, which by the scientifical botanist only can be disentangled. This will be the means that in not many years we shall know the olive plant as thoroughly as the grapevine, and avoid blunders which have been continued for centuries in the old world, with a plant that once occupying its place, is a permanent one.

4. Dividing the varieties which we shall early have the means of acclimating in our State, in early maturing, and late ripening ones, we may describe them each according to size of the fruit, taking the large sized first.

Sevillano Gordal.

5. Weight from 6 to 14 grammes; of the seedstone, $\frac{1}{6}$ of the whole weight; length of smallest fruit, 28 mm.; circumference, 20 mm.

Synonyms: Regalis, Hispana, Prunean de Catignac, Plant de Figuières.

Not a heavy bearing tree, with nearly vertical branches, the smaller branches inclining downwards by the weight of the fruit. Lustrous greenish wood, free of protuberances, leaves, bottle green above and greenish-white at the reverse, marked fibers.

6. The fruit of the Gordal Sevillano is the largest known. When ripe, its pulp is adherent and of bluish-black color. Being chiefly used for preserving, this olive is generally picked before maturing, its color being still green.

For bringing forth this state, the heat generation need not be more than 3400 degrees centigrade.

7. The tree exacts fertile soil, irrigation and manure in dry lands. Heavy amputations it cannot bear, especially when pruning takes place just before low winter temperature sets in and is prolonged. The resistance

of the Sevillano tree against frosts is proved in northern Spain, except when the frosts are too severe.

Manzanillo (Olea Pomiformis, Olea Spherica, or Ampoulleau).

8. This tree grows easily in good soils, with manure and water in the dry ones, and bears well; is of dark wood, has large, curved, clear branches, and the smaller wood dries up when the fruit is left to fall off. Fibers of the clear, green leaves, greenish white at the reverse, are little pronounced.

9. The color of this olive, when mature, is a brilliant black, pulp adherent; weight of medium sized Manzanillo olive, 7 gr.; of seed, $\frac{1}{8}$ the whole weight; circumference, 23 mm.; length, 25 mm.

As a pickling fruit and for oil, a very good olive. Ripens very early with 3400 degrees heat.

In all maritime olive regions of Spain, in Provence and Languedoc it grows in fertile soils. The tree exacts limited pruning.

Bellotudo.

10. A tree of full foliage and an excellent bearer, if treated with discernment. Leaves, clear green on the upside, of dirty green color on the reverse.

This tree is held in small estimation, as it is a scant bearer, but cultivated with care and intelligence may be made into a valuable one and results be modified. By aiding nature in the efforts to have the sap directed duly for rendering the blossoms fertile, an entire change may be brought about.

Weight of olive, 5 gr.; seed $\frac{1}{4}$ that weight; circumference, 19 mm.; length, 23 mm.

The vegetation of the branches of the Bellotudo inclines to be irregular, wherefore the pruning and cleansing of it should be performed with discernment.

Nevadillo Blanco.

11. Also called Doncel, Zorzaleña, lucia, argentata, and precox. This variety is of heavy bearing power. The tree has dense and very regular formed foliage. The wood is propense to inclining from the weight of the fruit. Unfortunately it is easily affected by frosts, and needs a sheltered location. Leaves, grayish-green above and of a dirty white below.

A superior kind of oil is pressed from the fruit, yielded abundantly by this variety. Weight of fruit, 4.3 gr.; of stone, $\frac{1}{8}$th; size, 15 mm. in diameter; 23 mm. in length.

In calcareous and siliceous soils, the production of the white Nevadillo is very regular; but it exacts corresponding cultivation.

12. The fruit is easily detached from the branch, and can therefore be gathered without in the least hurting the fruit. The energy of the tree seems to be directed to the fruit, rather than to the wood, the tree producing less branches than others.

Gordal.

13. Ocal, Olive real, Olea regia, Olea Europea hispalensis.

A tall tree, probably the tallest olive tree, and growing quickly. Its branches, which are lustrous and strong, are growing obliquely. Insects seldom attack this tree, which form warts where attacked, that close rapidly, the same as any wounds caused by pruning—heal at once.

14. Leaves, dark green above, white below, with pronounced fibers.

The fruit differs in size and shape from the Sevillano Gordal (§ 5). The present Gordal measures 23 mm. in height and 18 mm. diam. Its color, when ripe, is of a grayish-black; weight, 4.2 gr.; stone, 5-42 part. It is one of the best Spanish pickling varieties, and yields also good oil.

It resists cold, like the late maturing Cornicabra varieties, and is altogether one of the most acceptable ones.

Repeated and heavy trimming is a means of keeping this tree in perfect order.

Empeltre.

15. A name equivalent to "graft." This tree is the favorite of the northernmost olive region of Spain, as it grows easily, yields quickly and abundantly an early maturing fruit, the oil of which is of excellent quality. It resists the cold of a region which, without this variety, would hardly grow olives. This Empeltre olive is also a good eating fruit.

16. Contrary to the general rule that the olives which are fuller in their shape near the stalk are of the best quality, the Empeltre fruit, of largest circumference towards the opposite pole, is possessed of very good properties.

17. The leaves are short and very broad, the stone is long, its shape corresponding to that of the fruit; weight, 4 gr.; of stone, 1-5th; size, 16 mm. in diam.; 28 mm. in length.

The tree requires loose, fertile soil, and requires care, manure, and irrigation copiously. It is recommended as one of the earliest and most productive varieties.

Being a tree of scant branches, pruning should be done charily, for the vegetative energy of this variety acts chiefly on the fruit. Empeltre grafts are less developed than the tree grown frankly. In soil that does not require irrigation it bears best.

Carrasqueño.

18. The Carrasqueño is the French variety Redounan de Cotignac, a tree of small dimensions, of brittle, curved wood, and of not very showy aspect. The foliage is copious, of light green color on the surface and white at the reverse.

19. Weight of fruit, 3.8 gr.; of seed, 3-19 the total weight; 19 mm. diameter and 21 mm. in length.

The fruit is good for pickling and oil; but frequently succumbs before maturity to the attacks of worms. The tree exacts very good soil, manure, and attention.

Verdejo.

20. Known in France as Verdau and Verdale, this latter name also being given it in Spain—Olive Vividula.

In proper soil, a regularly large tree, small in other soils, having full branches and foliage. Leaves large and broad, clear green on the surface, greenish-white below, with fully expressed fibers.

21. Among the early varieties, this is one of the tardy ones. It has the great virtue of resisting frosts better than any other, except the variety presumed to be identical with our California Mission olive. Weight, 3.7 gr.; stone, 6-37 that weight; 12 mm. diameter; 22 mm. in length.

It is an excellent preserving olive, the oil of which is equally good.

22. This tree is prosperous in all the oil regions—southern, central, and the cooler northern of Spain; is, therefore, presumably adapted to all our California olive districts.

When the fruit is gathered before ripening for pickling, pruning need not be thorough, as the vegetative work of the tree is performed in a shorter time, and bears more abundantly than if the crop is left longer to ripen.

Racimal.

23. Or racemosa, bouteillan, boutinien, ribien or rapougette, in France.

This tree is of middling height; has long branches, the secondary ones inclining towards the ground, resists frosts well and grows with ease, and in soil not of first quality as to fertility. The leaves are small, apple-green on the surface, greenish-white on their lower side. The pulp of this dark violet olive is black.

24. The weight of this fruit is 3.7 gr.; that of the seed 7-37 that weight; diameter, 15 mm.; length, 23 mm.

It is one of the earliest of all olives. Its oil is of fine quality, but leaves much sediment.

The yield of the Racimal is only biennial.

25. The Racimal is well adapted to the coldest positions.

Although well provided with wood, it should be sparsely pruned, for the branches grow slowly.

Varal Blanco.

26. Called Blanquette in France, where, near Toulouse and Tarascon, it is grown also. Is a tall tree of quick development, with straight, large branches and strong wood. The strong vegetative strength of the tree requires keeping down of wood and foliage. This may be done effectively by applying the annular or ring cut.

27. The leaves are apple-green, and on the back greenish-white. Weight, 3.4 gr., and 3-17 of it that of the stone; diameter, 17, and length, 23 mm. The fruit begins early to ripen, but not all at one time. In Spain it is used only for oil, which is of very good quality.

The Varal Blanco is a fine stock for grafting on, and for that purpose it is mostly used, having a bad reputation as a most irregular bearer. Hidalgo Tablada assures that with his method of pruning, manuring, and applying ring-cuts, he renders this tree a good and perennial bearer. Pruning must be thorough on it.

Colchonudo.

28. Is a tree of large dimensions, provided with many long branches, the secondary pending and copious foliage. Its wood is strong, and not subject to diseases.

The fruit matures after receiving only 3500 degrees of heat.

With ordinary cultivation, it only bears every second year.

29. The leaves are dark green, and on their reverse, greenish-white. Weight of olive, 3.4 gr., the stone 4-17 that weight; diameter, 15 mm.; length, 20 mm.; color of olive, red. Yields excellent and abundant oil.

The tree is prolific in soils containing a large proportion of lime, and, if well treated, this variety, for its corpulence and general strong structure, is a most recommendable one.

Ojo de Liebre (Hare's Eye).

30. This tree is small, its branches are short and curved, the wood brittle. It requires a very good soil and careful cultivation. Leaves short and broad, of dark green color on their upper, and of dirty white on the reverse side.

31. The fruit is good for oil, yielding it in abundance. It ripens late among the early kinds. Weight, 3.3 gr., the stone 6-33; diameter, 16; length, 22 mm.

The fruit is of violet-black color. The pulp adheres to the skin.

32. This tree is not exigent as to soil, and grows in all regions. The brittle wood of this tree suffers from the vicious way of beating the fruit down, instead of picking it by hand, to such a degree, that, united to injudicious pruning, the effect is to make it an irregular bearer.

Varal Negro.

33. Or, Alameño (in France called Cañon, Nasies, Plant Etranger), is a tree of good size, tall, and well formed, with abundant and hard wood. It begins to sprout early, matures early also, but cannot resist frosts, and must be planted in sheltered spots. Leaves light green on surface, and greenish below.

Fruit of violet-black color, with red spots; weighs 3.1 gr., 9-31 of which is stone; 17 mm. circumference; 25 mm. long. Pulp adherent.

34. It yields plentifully good oil. Dry, ventilated positions, which are not cold, and calcareous, siliceous soil are convenient for this variety; also frequent clipping of branches, and the annular or ring-cut, in order to guide the sap for proper fertilizing of the blossom.

Redondillo.

35. Is a tree of middle size, and with branches growing somewhat irregular, if not kept within bounds. A tree that is vigorous in its functions of wood and fruit production. The wood is dark green and clean in its growth, free of all nodules or protuberances.

Leaves in shape and color peculiar, green above and whitish below.

36. Weight of fruit, 3 gr., 1-16 of it that of the stone; 16 mm. in circumference, and 18 mm. in length. Color, bluish-black, pulp not adhering to the seed. It is an excellent pickling olive, and just as good for oil. For the first purpose it is gathered unripe, thereby the vigor of the tree is enhanced.

37. The frost-resisting virtue of the Redondillo is great, and it requires less heat than most varieties, 3400 degrees. Thus, with its other good qualities, it is an important variety for all kinds of climates of the olive zone; and, when put in good soil, and well attended to, it compensates amply the care bestowed on it.

Lechin.

38. This is the *Picholine*, also called Cuquillo, Olea Ovalis, Oblonga, Taurine, Plant d'Istres, l'Olivier a petit fruit, Collias, and Coïas, known as the fine, sweet-pickling-fruit-bearing tree, which received its name from an agriculturist of last century of the name of Picholini.

39. The weight of the fruit is 1.3 gr., and the stone 3-13th of the same; 12 mm. circumference, 16 mm. length.

This tree is little damaged by insects, and under good conditions grows to fine dimensions, less so if manure is not abundantly administered. The branches should be allowed to be renewed in order to remedy their propensity to form warts. The branches are ordinarily inclined down, as the abundant fruit weigh them down.

The leaves are large, with gray spots on their bottle-green surface, while the reverse is of a clear white color.

40. The fleshy olives, which stick to the kernel, are of red color when ripe, yielding a very good oil, and for pickling green, excellent. In France the latter purpose is chiefly looked to, while in Spain the Picholine or Lechin olive is an oil-fruit. The names used in St. Chamas, "Picholine;" in Pezenas, "Piquette," and in Nimes, "Olivier de Luques," may indicate three subvarieties of the same tree.

41. This tree resists in cold regions up to 14 deg. C. below 0.; near the coast in southern France it may be killed by 8 deg. C. below 0. The abundance of sap may be influenced disfavorably by the coast climate.

The Lechin or Picholine tree needs more care than others in regard to keeping its branches and foliage well provided, as also in keeping it free of warts and protuberances.

Caianne of Marseilles.

42. Also called plant d'Aix, Cayon Aglandou, Olea Subrotunda, is grown round Toulon and Aix, a tree that grows easily, and its fruit of middle size, maturing in November, yields good oil. It is a biennial bearer, and does not resist frosts. Before coloring the fruit turns from green to white.

43. Another variety, cultivated in the south of France, and not susceptible to frost influences, is the

Laurine,

Also called Galliningue, Olea Angulosa, which yields a large, red, and spotted olive. Employed chiefly for preserving, as its oil is not fine, and holds too much separable matter.

Palma.

44. Is a French variety, grown in the Roussillon, also under the name of "Espagnol," considered one of the best frost resistant trees; but, together with its propensity of dropping the olives before they are ripe, it has the inconvenience of not being a good bearer. The olives yield a very good oil.

45. We may now take a view of the chief *late maturing* varieties of Spain, enumerated by Don José de Hidalgo Tablada.

Madrileño.

46. Or Morcal, Ol. Eur. Maxima, or Amigdalino. A middle sized, but strong and well formed tree, the branches of which are inclined downward. The leaves are small and broad, of clear, green color at the surface, and ivory white at the back. Weight of fruit, 12 gr., of which only 1-12 part that of the kernel; diameter, 28 mm.; length, 35 mm. The fruit is one of the best for preserving. It yields oil, but not in proportion to its size.

Cornicabra.

47. Called Cornezuelo, Rostrata, Crasimorpha. A tree of large dimensions, resisting frost. Some more synonyms of this tree mentioned by Tablada, viz., Grasse Cayane. Cayon might lead to confound it with the Italian-French Cayon, Olea subrotunda, but the latter name given it by Gouan shows the difference. The Cornicabra is presumed to be a senior in the family of the tall varieties of trees that are similar chiefly in the

pointed shape of their fruit. Our California Mission olive tree, not exactly of the nature of the senior, is probably one of this family.

48. The leaves are of dark, green color on the surface, and of clear white below. Fibers well marked.

Weight of fruit, 5.2 gr., 4-13 of which that of stone; diameter, 19 mm.; length, 39. Among the late ripening olives this tree yields those of best oil, but most of the early varieties yield better oil. Heat needed for maturing 3978 degrees. It resists frosts well, although rapid thawing damages the tree.

In the northern oil zone of Spain, as for instance, on the Ebro River, the Cornicabra tree of great size is called Azebuche, or wild olive tree, for the reason that the fruit does not ripen there.

49. The cause of this defect is given by Tablada, that the tree is not clipped, and the rows being planted too near, the mutual shade prevents the sun's action to sufficiency. The tree lives in all soils, and is prolific in fertile, ventilated ones, with abundant care and manure. Pruning has to be done intelligently.

Cornezuelo.

50. Also called Cornicabra, Olea Europea ceraticarpa, O. E. adorata (in France, Odorant, Luquoise (La Lucques), is a tree similar in size and shape to the last described tree, being a variety of the same; but is distinguished from it by the shape of leaf, seed, size of fruit, and its smell.

Leaves broader than the Cornicabra and shorter; color, apple-green above and greenish-white on the lower side. Weight of fruit, 3.1 gr.; 6-31 of which for the stone. Size, 15 mm. in diameter; 28 mm. long.

51. The fruit yields very good oil—the best oil produced in the center of Spain. It ripens late. It is, perhaps, the olive tree requiring most degrees of heat of all to ripen its fruit. Resists frosts, and is, therefore, generally planted in localities that have cold winters.

52. On the elevated olive plantations near Madrid the crop is picked in January, often without maturity being completed.

The tree requires manuring and care; also, good, loose, ventilated ground. The young trees bear better than the old ones. It contracts warts and protuberances. Dryness does it no great harm.

53. Repeated careful pruning, avoiding amputation of large limbs, are necessities, and judicious frequent clipping is convenient for rendering the bearing faculty of this tree regular.

These notes apply to our California olive trees, for, comparing all marks, the identity of it with the *Ceraticarpa* or Cornezuelo will probably be confirmed.

Javaluno.

54. This tree of prolonged vegetative action during the working period of the year is hardy, and resists, but less than the Cornezuelo, frosts. Leaves large, gray-green in color on the surface, silver-white below; weight of fruit, 6.2 gr., 6-31 of which that of the stone; diameter, 20 mm.; length, 30 mm.

The fruit and its stone are very much like those of the Cornezuelo, only the Javaluno olive is larger than the latter.

The fruit is easily attacked by insects. Good soil and careful cultivation are requisites to draw annual good crops from the tree. If these conditions are not fulfilled, it may bear once every three years.

Picudo.

55. Also called Tetudilla, is a good sized tree, of strong foliage, and yields a good eating fruit. The good tasting flesh is loose on the stone; leaves dark green, and on the reverse of greenish-white color; weight of olive, 5.2 gr., 3-13 of which that of the stone; diameter, 18 mm.; length, 30 mm. Yields plentifully good oil.

All other conditions of the Picudo are essentially the same as those of the Cornicabra varieties. Cultivation requirements likewise.

Nevadillo Negro.

56. Black Nevadillo is a middle sized tree, with full foliage on short curved branches. Color of the leaves dark green, and on the reverse of mother-of-pearl-white color. Leaves small.

The olives terminate in the shape of a pointed hook. The fruit weighs 4.3 gr., 7-43 of which the weight of the stone; pulp adherent to the latter. Size, 15 mm. in diameter; 23 mm. in length.

57. This olive is greatly esteemed for the copiousness and quality of the oil it yields, and the tree is particularly liked for the constancy of its regularity in bearing. It resists cold, and is among the late varieties the latest ripener.

In the province of Jaen, an olive plantation having one third of this Nevadillo (black) is sure to be valued much higher than others not having this variety.

It requires good soil, like all copious bearers, as well as careful cultivation, but will bring forth most fruit from its blossoms if these conditions are complied with.

58. A few other Spanish varieties may be mentioned among them:

Olivo Vera Fina.

An early maturing and frost resistant tree of small dimensions.

Olivo Herbequin.

59. Also very small in size. A very early maturer and frost resisting to an enormous degree. Tablada supposes it to be related to the Racimal, § 23.

Bermejuelo.

60. Growing in dry soil in the northern zone in Spain, and doing well.

Arolo.

Or Olea Eur. arolensis, similar in wood to the Manzanillo, yielding fine black olives, suitable more for preserving than for oil.

Loaime.

61. Supposed to be the Pausia of old Columella, and identical with the French fruits "Noirs et Doux" and the "Neapolitan Pasola," an early maturer, yielding a fine tasting olive of middling size. Good also for oil.

62. For the sake of completeness, the *principal Italian olive varieties* may be shortly registered here.

The cultivated varieties are divided by Professor Caruso in his recent monography in three classes:

63. 1st. The most rustic ones grown from seeds of noble kinds. These bear on trees which are not large, but hardy, olives of different sizes, with but little pulp. (Olivastri.)

2d. Middling type (Mezzani) of less rusticity with fleshier fruit. Trees of middle size.

3d. The best kind (Frantojano); trees of different sizes, with pendant branches, producing olives of best flesh, oleaginous, although some varieties are not good oil givers.

The branches of the first class are erect and robust; of the second, less straight; and the third class pendant.

64. Varieties of first division mentioned. Of Tuscany: *Oleastro*, *Leccino*, *Mignolo*, *Puntarolo*, *Trillo*. Of Sicily: *Ulivastro*, *Cerasolo*, *Nervo*, *Crasturuffo*. Of Calabria: *Coccitano*. Of Puglia: *Cellinio*, *Nardo (Leccese)*. Of Liguria: *Salvatico*, *Mortino*, *Colombaro*.

Varieties of the second division. Of Tuscany: *Morajolo* or *Morinello*. Of Sicily: *Caltabellotese* or *Palombino* and *Bianchetto*. Of Calabria: *Rotondello* and *Ottobrario* (or October olive). Of Puglia: *Monopolio olive*. Of Liguria: *Merlino of Albenga* and *Pignolo*.

Varieties of the Frantojani or third division. Of Tuscany: *Frantojo*, *Razzo*, *Razzolo*, *Grossojo*, *Correggilio*. Of Sicily: *Ogliojo* or *Ugghiaru*, *Nebu* or *Zaituni*, *Calamignaru*. Of Calabria: *Mammola of Puglia*, *Paesano di Bari*, *Ogliorolo*, and the *Raciuppe* olive of Corato. Of Liguria: *Tagliasca* or *Toggiasco*, *Pignolo of Oneglia*, *Lavagnino* and *Razzolo*.

65. Three hundred and fifteen names of the olives grown were gathered in the official reports to the Italian Agricultural Department, but the frequent repetition of a variety under many names may lead to reduce that number in truth by probably nine tenths.

66. Frost-defying varieties of the above are *Morajolo* (*Morinello*), which contents itself also with poor soil. It bears a large fruit of heavy pulp, but yields only middling quality oil. Mignolo (Gremignolo), resistant to strong, cold winds, is a tree of small size, fertile, yielding fruit with regularity. Fruit matures in December. This would be a good tree for exposed positions. Fogs do it no injury.

67. Leccino is a powerful tree for cold and windy spots, the more so as it bears plentifully a large fruit, rich in oil. It matures in November.

Puntarolo, *Trillo*, and *Morchiacci* are varieties that can stand frost. These seem to correspond to the fruit, somewhat point shaped at their lower pole, to which our own Mission olives belong; but they differ from ours in being less rich in oil than the latter.

68. The Calabrian *Ottobrario*, although susceptible to cold, might be valuable for our southern counties, and it is also doing well in level positions and low plains.

A very precocious fruit is that of the Ionian variety, *Mammola*, but it is delicate in regard to cold. The olive is something of the shape of a pear.

A hardy and tall tree is the Coccitano, resisting frosts, but a poor bearer. As a stock for grafting, it may be of merit. The fine oil of Bari is grown on the *Paesano di Bari* or *Baresano*, a very tender tree.

69. An enumeration of the varieties eligible, according to Professor Caruso, for pickling, is the following: *Giaraffa* (Nocciolaja, Neba), *Mammolese*, *Carolea*, *Zinzifari*, *Imperiale*, *Barbagianni*, *Oliva di Spagna* or *Grossa*, *Santagostino*, *Andria*, *Oliva dolce*, *da curare*, *Olivotta*, *Compostar di Spagna*, *Zentil*, *Compostina*, and the French kinds—*Royal*, *Amandier*, *d'Espagne* or *Plant de Fontvielle*.

Short mention may be made of the following preceding varieties:

Pignolo.

70. Grown extensively near Genoua, a tall tree of rich growth and great power to withstand frost. It is little exacting as to soil, yields large, early maturing, very dark olives, but these are not holding much oil.

Colombaro.

71. Called in some parts Olivastro, in others Mattaro, Ponentolo, and Spagnuolo, a tall tree, yielding very big olives. It will not succeed in moist positions, nor where it is exposed to strong winds, but will resist frosts.

Casalino.

72. Or Nostran, a tree which is impressionable from frost, grows to either small as well as high dimensions, and is very fertile. Its olives are small.

Gargnan.

73. Is a hardy tree, fearing frosts less than fogs. Its size is small, its fruit good and rich in oil.

Tombolot.

74. Or Drop, is an Italian olive tree, of large size, very rustic and frost resisting, yielding plentifully. Fruit of small volume.

Caltabellotese, or Palombino.

75. A middle sized tree, also very hardy, tolerating cold of the highest positions, growing easily in 2,500 feet high locations in Sicily, ripening its fruits early, the same as the *Termini* or *Calamigna*, likewise a fertile tree, and very hardy.

Cerasolo.

76. Is a southern Italian tree, growing in plains as well as in elevated places, not afraid of fogs in the level lowlands, and ripening its fruit early. The olive is not rich in oil.

77. The soil requirements for favorable growth of the olive tree are the same in substance as those of the grapevine.

Where freshness and moderate moisture are present, the roots remain near the surface. In permeable, loose, dry soil, they penetrate deep, searching and spreading for convenient food.

In sandy soil, or a hard, cold one, where no subterranean infiltrations from elevations aid, the tree suffers.

Depth of the lower stratum should be ample.

In some soils irrigation is a necessity for the olive tree, in others watering would be injurious to it.

78. Lime, silica, alumina, salts, and alkalies and oxides should be in the soil. Abundance of potash and lime is important. Vulcano-granitic compositions in soil are extremely favorable. Red soil, having iron oxides in regions where the heat in winter is scant, is a boon for the tree. In hot plains the sun's rays on red soil may act often unfavorably.

Potash formed from schistose, basaltic, and feldsparic elements in all shapes, carbonated, nitrate, and chlorhydric, is always the salt that tends to keep liquid the sap, soluble in iron.

Where lime is present in good proportion in the soil, the fruit is sure to be heavy. Lime seems not to reach the pulp of the fruit, but to remain in the leaves. The pulp absorbs more potash.

79. Having scientists in our midst, who will be the guides of the practical growers, and a full amount of intelligence among the latter, it will not be difficult to solve the question of probable success in the many species of soil in the State. But it seems to be obvious that the more elevated positions are preferable to the plain for the olive plantation. Working together and trying in all parts, if only on roads and the border of a farm, many kinds of olives, will lead to valuable experience.

EXPOSURE.

80. Too much heat at a time, and too severe cold affect the olive tree equally. Thus the tree has to be planted in regard to its exposition, in accordance with the latitude and height of the location above the sea level. Where irrigation is available, the southern exposure in places where the air can freely circulate, is, as a rule, the most adequate one, particularly in the cooler regions of the State.

A northern exposure, by reason of the sun's rays not acting sufficiently long and partly obliquely, retards maturation, and may even prevent its completion.

81. In an eastern exposure, the sun in spring raises the temperature very rapidly—a dangerous matter where frosts may strike. The same as in a northern position, the differences of temperature are brusque.

Slopes seem to be the natural locations for the olive tree. For calculating protection, both of shade and shelter, in any position, we may act upon the principle that over 11,000 feet of extension, a range of hills of 1,000 feet elevation shelters 1 to 11, and that beyond that distance the action of heat and winds is naturally fierce. To give their due to trees growing on inclined positions, banks or terraces should be arranged.

82. The olive tree, in its natural condition, shuns extreme temperatures. Excessive heat and dryness alike, as great cold and moisture are not to its taste. A well-tempered air of pretty even temperature conduces to its prosperity. The tendency of the tree to incline towards the sea, the emanations of which mitigate the excessive northern cold, prove this, as well as its favoring the shelter of hillsides.

83. The atmospheric conditions with relation to the olive tree have been resumed by the observant people of the most important oil-growing countries, in the principle that, from the moment of finishing flowering, the heat to be generated for completely maturing the olive need be at least 3978 centesimal degrees, although for several varieties 3400 degrees suffice. The total heat to be supplied during the twelve months of the year would be, 5378 degrees. The balance above the vegetative season, of course, is unnecessary in some degree. The extreme cold which some varieties can endure seems to be 7 to 8 cent. degrees below zero, or about 21 to 22 degrees F.

84. For what it may be worth for the practical man, a few instances are quoted here, upon which observations may be made to arrive at conclusions respecting the amount of heat obtainable for success with olive culture.

85. The geographical position and elevation of the locality has to be considered beforehand, and our division of regions where the olive will succeed might be classed thus:

1st. Where the temperature does not expose the tree to damages by frost.
2d. Where frosts will sometimes hurt the branches.
3d. Where, periodically, frosts do damage to the tree.

86.	ITALY.						SPAIN.					
	PALERMO.		NAPLES.		SIENNA.		VALENCIA.		MORATA (MADRID).		SALAMANCA.	
	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.	Days.	Mean Temp.
April	15	15.3	15	15.5			15	19.6				
May	31	18.1	31	19.9	10	16.4	31	23.1	10	19.2		
June	30	22.8	30	23.4	30	19.9	30	24.5	30	25.2	10	19.2
July	31	25.6	31	25.9	31	23.4	31	29.4	31	26.3	31	28.7
August	31	25.4	31	25.3	31	21.5	31	30.2	31	26.1	31	25.8
September	30	23.6	30	23.2	30	18.9	30	26.5	30	20.2	30	23.3
October	31	19.5	31	18.5	31	12.8	31	21.6	31	14.3	31	13.6
November					30	7.7			30	10.1	30	10.6
December					31	4.9			31	5.7		
		150.3 7:		151.7 7:		125.5 8:		174.9 7:		147.2 8:		121.0 6:
	199	× 21.4	199	× 21.6	234	× 15.7	199	× 24.98	234	× 18.4	163	× 20
		4258		4298		3673		4971		4305		3260

The heat degrees of Sienna and Salamanca do not reach the average mean cipher, render all varieties impossible to mature at Salamanca, and allow only a few near Sienna to arrive at ripening. In sheltered valleys near Sienna circumstances, however, do not exclude possibilities.

87. Mr. Ellwood Cooper, although not mentioning in his treatise on olives any particulars about his experiences in regard to heat necessary, will be able to give his valuable practical views. Mr. Frank A. Kimball mentions that on trees on one plantation, at the San Diego Mission, there are notable divergences of periods of maturity, distant even by more than a month. His observations, which probably will mostly be found necessary in the matter of heat supply, may be valuable enlightenment for home application.

88. Mention should be made about the influence of saline matter as food for the plant, and the pregnancy of the sea air with it as of beneficial influence for the olive tree. That this tree prospers near the sea is known; but the principle does not hold good that it is not equally and as essentially an inland plant. A hundred, nay hundreds of miles distant from the sea the finest of fruit is grown on perfect olive trees. Saline matters are unnecessary to rich soils—that means such that are possessed of ammonia and nitric and carbonic and azotic substances.

89. In Santa Barbara Mr. Cooper planted at twenty feet distance, and seems satisfied that for that locality it is sufficient. We require practical tests for different regions, which are sure to be made. It will be obvious to our planters that it is a matter of great importance. That variety, soil, ventilation, or shelter, and whatever other influences may bear upon the subject of distance for planting, will require different systems, you will know fully. Nothing can hinder later to make gaps in a plantation that proves too densely planted.

To instance the variable practices of planting distances in Italy, the following notes may be to the point:

90. It will be well to observe that Gasparin's theory to distance trees, according to the height of them, is accepted only partially; and it seems clear that the space shaded by its branches is equally to be considered. Distances customary in plantations between two trees:

In single olive plantations: Sicily—In poor soils, 24 to 33 feet; in consociative plantations, 36 to 45 and 48 feet; rich soils in plains, 36 to 48½ feet; in consociative plantations, 51 to 60 and 70 feet.

Sardinia—In single olive plantations, 23½ to 24½ feet; about eighty trees to the acre.

Calabria—In single olive plantations, 24 to 32 feet; in consociative plantations, 39 to 48 and 55 feet.

Lucca, on terraces—21⅓ and 10⅘ feet on the incline, each 76 square feet; about 160 trees on an acre.

On the hills of Pisa, on terraces—14½ feet in square; 180 trees per acre, and in other olive orchards 250 and more trees to the acre. This dense planting is criticised by Professor Caruso; and he proposes for that region about 40 per cent greater distances.

Tuscan Hills—15⅓ to 21 and 24 feet; 150, 80, and 60 trees.

Val d'Arno—21⅓ to 28⅖ feet, according to more or less fertility.

Verona—12⅙ to 15⅕ feet.

Liguria, on hills—24 feet in file, and 15 feet on the incline.

91. In France, near Nizza—21⅓ feet; about 80 trees per acre; on low foothills, 27⅓ feet; in the southern departments, 15 to 16½ feet in the same file, and 24 to 33 feet from one file to the next.

92. When planting olives in consociation with vines, a distance of from two to four vines is left in Spain, according to the interspace left between the vines.

The advice about distances given by Hidalgo Tablada is to take twice the height of the tree as such, for the reason that the diameter of the foliage is about the same as the height of the trunk, and so the functions of both should be done justice to. The roots of the tree extending to one and a half the diameter of the crown of the tree, the leaves being small, needs ventilation, also to keep it in health and power against nodosities and warts, the double height of the tree as distance to the next one seems to him neither too far nor too near.

93. The ground into which olives are to be planted must be clean of roots of woody plants and of herbs. One and a half feet deep is the advice in Spain for opening the ground. If possible, open in the fall, previous to planting, for saturating with atmospheric fertilizers. Quadrangular holes are advisable. Depth is an object, which is repaid by a faster development of the plant.

94. The advice given by Dr. Bleasdale, to assist the vegetation, of a truncheon to be put in the ground, by putting some barley in the short saw-cuts, and also barley, instead of manure, at the bottom of the hole, to receive the truncheon, seems a good one. Manure and water, of course, ought to be supplied, before planting, to the opening for stimulating germination. Situating the truncheon in a way that it raise straight, dissimulating any curve it may have, should be considered of importance.

95. For the warmer regions it is convenient to cover the part of the truncheon that remains above ground as much as possible. In southern Spain, a tube of moist earth is put around the truncheon, leaving only eight to ten inches uncovered at the top, whence shoots are to come forth. This is a good way to prevent the drying up, as only evaporation is going on, there being no roots yet for absorbing. At about middle height of the funnel of moist earth around the truncheon, an aperture for watering in summer is

left. Where irrigation is practicable, this hole is, of course, omitted. Dry herbs, or some other protective means, around and on top of the pileta, as this funnel is called, against the sun's rays are advisable.

The length of the truncheons is indifferent, four, five, or six feet, the length above the ground to be about one half. Dr. Bleasdale put five feet long truncheons, two and a half feet deep in the ground. The method of planting described by Mr. F. A. Kimball is identical with advices and descriptions of Spanish and Italian authors, as well as of the practical and most intelligent planters of those nations.

96. Short truncheons (garrotes) of two to three feet in length are planted, with the tops covered, about four inches deep under the ground.

Manure ought, of course, to be supplied to the truncheons in the hole. The young plants ought to be well attended to, and the ground loosened four or six times the first year.

97. To obtain plants with roots, open ditches, one and a half feet deep, and six feet distant one from the next ditch, from south to north, ventilate the soil for some time. Let the cuttings be nearly eleven inches long, as advised by Tablada, or ten inches, according to Kimball's rule. The cuttings should be of clean wood, about an inch thick. Plant them vertically, the tops being some six or seven inches lower than the surface of the soil. The seven inches above the top of the plant remain uncovered. Germs will eventually appear at the bottom of this open part of the ditch. After the frosts of the second year have ceased, the weakest and worst situated germs are taken off the plant, the most vigorous ones being left, trimming those above seven inches long, and putting manure to the young tree; cover up again.

98. Regarding the propagation by cuttings, Mr. Frank A. Kimball published rules in a concise form, which may be resumed as follows:

Experiences since 1870 have led that gentleman to adopt the length of ten inches. He leaves the tops of the cuttings in the nursery an inch or two above the ground, and thirty inches between the rows. The tops are covered by the earth thrown out in making the trenches.

For orchard planting, Mr. Kimball makes a basin two feet in diameter and three inches deep, with the cutting in the center, and about level with the bottom of the basin, covering the top three or four inches with earth, irrigating in the summer three or four times, pulverizing the earth after each watering.

Pack the earth closely by tramping it with the feet while being filled in around the cutting, beginning at the bottom and continuing to the top.

He condemns, and justly, the simple making of a hole with an iron bar. He plants with a spade, pressing the earth against the last one in making the opening for the next, thus closing the earth well around the whole cutting.

99. As any practical man knows, the ground in the nursery requires frequent moving and keeping it loose, in order to allow moisture to be supplied for the drain of it by active evaporation, not in equilibrium with absorption.

Respecting grafting, practical people who are not wanting, can give information far superior to what can be extracted from books. The methods do not vary from grafting used on other trees. It should, however, be stated, that where wounds have been made for the insertion of grafts, they should be closed with a wax preparation, of which three Italian receipts are given here, and a ligature placed around the graft of some flexible fibers, straw or the like, not covering, but leaving a traversal vacuum for access of air, simply for keeping the grafts in place.

100.

Black pitch	28 parts weight.
Colophonium	28 parts weight.
Yellow wax	16 weight parts.
Tallow	14 weight parts.
Ash or ochre	14

— 100 parts.

Make a good grafting wax:

Black pitch	45
Colophon	27
Tallow	10
Red ochre or ash	18

—100 weight parts, another.

Black pitch	60
Tallow	30
Sulphur	10

— 100 weight parts, a third composition.

101. Transplanting is an operation which can be performed in the same way as it is generally done in the case of other trees, but observing the rule that no roots be hurt in any way, and these be able to extend in the ample hole for receiving the tree. Thus it can easily continue its functions. Rather than double up a root in case of scarcity of space, cut it. Trees to be transplanted should be deprived of small branches and leaves.

Transplantation should take place in winter, when the plant is in relative repose, and can, at the right time, from the start develop root activity in the new site. In soil that is not very permeable, put mineral elements, such as ash, sand, and lime debris, in the hole. In loose soil some loam may be put in, but in either case a dose of thirty to fifty pounds well fermented manure should go in as well.

Always avoid leaving roots a long time out of the ground.

102. Both shaping the tree by pruning into the form that allows of receiving all possible influences of the atmosphere, and keeping its height conveniently, that is, moderating its upward tendency, are points that practice has demonstrated to be of great interest.

The goblet shape (the lemon form as called in Italy) of the crown seems to be very proper for trees of varieties growing high.

For varieties of low growth the practice of trimming them into the open form is criticised because particularly in cold positions the frosts may exercise an active influence on the large exposed mass of the limbs.

103. A means of stimulating the production of an olive tree often employed is rather that of regulating the descendant flow of sap by keeping it for vigorous action impulsed towards the fruit. This end is obtained by the ring-cut around the base of the branches, viz., taking away a small section of bark. This is done at the period when the blossom is about to form the fruit, before the blossoms open. By the retention of the sap in the limbs, the fecundation of the blossoms is thus made sure. The operation of the ring-cut should be performed with great judgment, in order not to weaken the wood for the future.

104. Where the fecundation of the nascient fruit is observed to be difficult, indication is given of the lack of phosphates. That fertilizer is needed in that case. In cold regions, sheep and goat manure; in less cold regions which are not very moist, horse manure, and in warm regions that of horned cattle are convenient for olive trees. These manures should be well rotted and passed fermentation.

The same as to the grapevine, it is advisable to return to the olive tree all the rests of the manufacture of oil and the wood and leaves taken from the tree by pruning and trimming.

Add to the manure for enriching it, where obtainable, marine plants, algæ, cane, leaves of corn, straw of cereals, branches of the vine and herbs (macerating these matters well), ashes, paste of rotten olives, slime and deposits of water used in the oil press establishment. These matters should be heaped about one to two feet high, and a slight covering of gypsum in powder put on it. The liquid running off, after the rains have penetrated it, may be used for irrigating.

105. Respecting irrigation, which is indispensable in many localities, every one will concur in the greater effectiveness of the water, if allowed to pass through recipients where the manure is kept, affording thus the opportunity of carrying dissolved elements for vegetative nutrition to the trees.

The system of putting manure at the foot of the olive tree without attending to the proper alimentation of all the parts composing the tree, is not approved of. A small ditch at some distance and around the tree, depositing the manure in this circle, covering it up with the earth dug out, will be a means of transmitting food to the whole of the tree and not to the trunk alone. Before the rains set in, this should be done. Calcinated bones and rests of dead animals are useful for nourishing the tree.

106. Olive trees raised from the seed generally possess all the characteristics of the wild olive tree—*Oleo Europea*, variatas of Linné. This means of raising an energetic stock, especially for grafting, is recommendable. Free the seed to be planted in autumn from all oily adherances by keeping it for a few hours in a lime lye; one inch deep, put the seed into the well and deeply loosened ground, covering it up to have the plant come up in the next spring. Keep the herbs away. When the plant is almost a foot out of the ground, the roots will have gone two feet deep into it. When transplanting these olivasters after some years, the central root should not be put more than a foot deep, cutting the root if longer, so that the whole plant be a foot long.

107. Consociative plantations of olive trees and grapevines is advocated by Tablada unconditionally; by Caruso considered convenient and advisable where it proves for the sake of profit to be advisable. In Italy olive planting is frequently consociated with that of carob and almond trees and with the prickly pears, called by Italians the Indian fig; also with pomiferous trees. In observing the habits and requirements of the olive tree, it will be very probable that our own pushing and reflecting horticulturists will find appropriate trees for interspersing with a plantation of the olive in our State. In this respect, there is a wide field before them, where untrammeled by prejudices of traditional habits, new paths may be opened, and in course of time the benefit of the experience in the old world may be returned to those we shall emulate.

108. Guided by a scientific body, such as the Berkeley botanists are, and applying the good practical sense, our fruit and grape growers will easily become versed in the botanical properties of the plant that occupies us, and it will be superfluous to treat the particulars here of the anatomical considerations of the plant and its organs, its physiological aspect and habits, the details of climatic and geological circumstances, applied to olive culture, for I lack the requisite knowledge to impart anything in that regard. You practical men will aid our scientists; for they, in the course of their own spontaneous and generous efforts to know the plant well, have need of your coöperation. Let all join in making the olive a Californian product, and in trying to be ahead of others, or, at least, as our lives are short, to enter into file.

109. The subject of knowledge of plant-enemies has, with enviable energy, become a Californian specialty. Leaving this inexhaustible field to those who will be our benefactors, by mastering the matter thoroughly, to fight with ease against the many scourges, I shall, in conclusion,

enumerate yet the evils the olive tree is beset with in the old world, resuming briefly what specialists tell us of them.

110. *Caries* is not unfrequently caused by the injudicious way of picking the fruit, beating it off the branches with sticks, and injuring the branches. Why should not care be exercised in doing that work by the hand? The most ignorant ought to know that the tender shoots called to bear the fruit the following year should be gently treated, not broken.

Kermes are insects infecting the branches and leaves. Keeping the tree clean, this enemy, showing itself and multiplying quickly in localities where the circulation of air is hindered, may be avoided.

Negrilla or *Negra* is a disease that has done enormous damage. It is presumed to be caused by a cryptogam that respects none of the parts of the tree, covering the pores in all green parts of the tree, preventing even the flow of the sap. Density of branches is the prime condition of the existence of this fungus (*Dematium monophyllum*). The cause and its removal, upon investigation for years, seem to have to be looked for in wrong conditions of the soil.

111. The *Æcophora*, a moth, putting its eggs on the inferior part of the leaves, in spring takes to the young shoots and the buds.

The fly *dacus* puts its eggs on the fruit of the olive tree. A worm develops from the eggs, boring into the pulp.

The *Psylla olivina* is a jumping winged insect, which, at the time of the flower forming, multiplies and causes a viscous cotton-like substance, where it acts.

The boring beetle, *Hylesinus*, multiplies enormously, and may destroy the branches of the olive tree.

A microscopic insect, *Aspidiotus conchyformis*, acts upon the bark of the tree, covering it densely, where allowed, and may, if not brushed off, cause great damage by sucking descendent sap.

A boring worm, called *Taladrillo* by the people, is believed to be produced in the third generation by the œcophora moth, but by others to be an independent genus, because it only bores the fruit, a habit not indulged in by the fly, is equally molesting, as the fruit of a tree on which the taladrillo ravages must be picked green, and be pressed, in order to avoid the eggs to be formed for the next season.

Thrips physaphus (Linné), an insect of dirty white wings, is a pest probably analogous to the thrip that troubles our grapevine.

A fungus, *Agaricus*, attacks the roots, and, if not disturbed in that work, may cause the loss of the tree.

112. Protuberances, warts, knobs, excrescences, on olive trees are generally caused by insects.

As a rule, the olive is a healthy tree, and remains such to any age, free from enemies, where proper watchfulness and the care of its owner protects it from them.

* * * * * * * *

Notes on Preserving Olives.

113. There are several systems of pickling olives. For this purpose, the fruit is gathered green; this is particularly the case with the big sized, fine olives imported from Seville, Malaga, and from French and Italian ports. Other varieties of small size and nice tasting are gathered nearly ripe for pickling.

To pickle or sweeten them, the olives are put in fresh water for five or six days, changing the water each day four or five times. When thus they have lost the bitter taste, they are put in a basin full of brine, keeping them immersed fully in the same. Frequently some fennel is put on the top. After sixty days, the olive will be fit for use and keep until next year.

114. If the olives are to be used quickly, they may be opened, and the stone taken out previous to being put in water; and, after having been kept in frequently changed water for four or five days, to be left in lye for six or eight days, when they may be eaten, either alone or with oil and vinegar, like a salad.

Another way to pickle is putting the olives in lye, not long enough to penetrate the whole of the pulp, and when appearing to be free of the bitter taste, leaving them four or five days in water, daily two or three times to be changed. They may be kept put into salt water. Fennel, mace, coriander seed, rosewood, cloves, and cinnamon, may be added for flavoring.

115. Olives for drying should be fully ripe, left in the sun for fifteen or twenty days, and a little salt be put on them. Or they may be placed in a basket with a stratum of salt, when, after a day the vegetative water sweats out, and five or six days later they may be eaten, being a fine nourishing condiment of, or rather a substitute for, meat.

The dried olives are kept in families for use all the year round; and, by soaking in water, after they are swollen to their original size, become very palatable.

In conclusion, I wish to pay a tribute to a distant benefactor who, I am sure, will continue his assistance to the development of our California olive industry, Professor Caruso, the Director of the Agricultural Department of the Royal University of Pisa, who spontaneously has given his generous permission to *translate from his new work whatever points may be of service to American olive culture*, of which permission I have not hesitated to make ample use.

A SHORT TABLE OF COMPARISONS OF FAHRENHEIT AND CELSIUS (CENTIGRADE) THERMOMETRICAL INDICATIONS.

Fahrenheit.	Centigrade.	Fahrenheit.	Centigrade.	Fahrenheit.	Centigrade.
0	−17.78	35	+ 1.68	85	+ 29.44
5	−15.	40	4.44	90	32.22
10	−12.22	45	7.22	95	35.
15	− 9.44	50	10. —	100	37.78
20	− 6.67	55	12.78	104	40.
25	− 3.89	60	15.55	113	45.
30	− 1.11	65	18.33	140	60.
31	− 0.55	70	21.11	185	85.
32	0.	75	23.89	212	100.
33	+ 0.55	80	26.67	...	...

HOW TO PICK, PACK, AND SHIP CITRUS FRUITS.

By Colonel J. R. Dobbins, General Manager Orange Growers' Protective Union of Southern California.

INSTRUCTIONS.

First—Only shipping thoroughly sound, ripe, sweet oranges.

Second—Carefully picking and curing.

Third—Properly packing, with greatest care and honesty.

The clean, bright colored, smooth, fine skinned, and firm oranges, carefully picked and properly packed, will always command fancy prices. Medium quality, in color, etc., should receive equally as careful attention as the fancy. Poor fruit, inferior in color, quality, etc., should be worked off at or near home markets. Oranges of a medium size, running one hundred and seventy-six and two hundred count to the box, packed in regular graded sizes, sell to the best advantage.

First—The fruit should never be picked green—a few green or off colored oranges in a box only may lose a sale or cause low prices for the whole lot; whereas, well matured oranges of fine color will always command good prices. Do not be in a hurry to ship, only picking the bright, ripe oranges, first lightening up the trees. March, April, and May (and even in June) are the best months in which to ship our oranges.

Second—Careful picking should be the rule. Do not bruise or injure the fruit in the least. One rotten orange in a box means the loss often of the whole box—often several. Select a dry day on which to pick. It is better to cut the stem close to the orange rather than pull the orange. However, pulling can be done more expeditiously, and for the present will be resorted to. A skillful hand, with a practical twist and double jerk, can break the stem in the eye with no danger of tearing the skin. Freshly picked oranges, when heaped together, will heat and sweat at an ordinary temperature. For this reason they should not be packed immediately after picking, as the danger of loss from rot and decay is thereby increased. They should be placed in bins, in a dry room, raised slightly from the floor by means of slats, and kept from three to five days in this condition. Unless the weather is very cool they will go through a natural sweat, in which the surplus moisture of the fruit escapes and the rind becomes tough and pliable. Many unseen imperfections, such as slight bruises, etc., will also develop into spots and permit a more certain selection of perfect fruit for market. When, by reason of low temperature or other cause, the oranges do not sweat naturally in the boxes, some successful packers use artificial means, such as covering with blankets, etc. Others do not consider this necessary. During the sweating process the oranges should be carefully examined from time to time, and in from three to five days a slightly sticky appearance will be noticed on the rind. When this appears the fruit should be thoroughly aired until dry and ready for packing.

Third—Properly pick and assort very carefully as to size and color. Never put large and small oranges in the same box. Each orange should be wrapped separately in fruit paper, containing as little oil as possible, so that it will readily absorb and throw off moisture. The wrapper should be careful to reject every bruised or otherwise injured orange. The packer should be careful not to put different varieties in the same package. The buyer should be able to know when he has tasted any oranges from a box or brand, that all others from the same brand or box are its equal, as near as may be. In packing, the oranges should be placed one by one, closely together in layers, so that there can be no rolling or sliding of the fruit in the box. The top layer should project not less than one half an inch nor more than three quarters of an inch above the side of the box, so that the top, when nailed on, should hold the layers firmly in their places, even after there has been some shrinkage of the fruit. This is all important when the fruit is to be transported a considerable distance, especially by rail.

The count should be plainly marked on the package, and each package should contain the exact number of oranges thus marked on the outside, no more, no less. This is important, as retailers sell by the dozen and always prefer to know just how many oranges they are getting. The number contained in a standard box, also gives an exact idea of the size of the fruit.

The standard counts to the box are eighty, ninety-six, one hundred and twenty-eight, one hundred and forty-six, one hundred and sixty-four, one hundred and seventy-six, two hundred, two hundred and fifty, three hundred and twenty-four, and fruit graded to these sizes and properly packed in regular layers fit and fill up the boxes in the best possible manner.

The boxes for packing should be of light, dry material, neatly and strongly put together, dimensions, twelve by twelve by twenty-six and a half, outside measurement, with partition exactly in the middle.

PROFITS OF FRUIT GROWING AND CO-OPERATION OF FRUIT GROWERS.

By George Rice, of Los Angeles, in "Pacific Fruit Grower."

Instead of lying in the blue grass under the evergreen foliage of the orange, lemon, and limes, with rich, golden spheres overhead, beautiful to the eye, and promising wealth to the pocket, you will find the soil most thoroughly cultivated; not a blade of grass or a weed is allowed to grow, and much labor—intelligently applied—is required to reap the golden profit that the orange and lemon so readily yield. Citrus fruits require a great deal more attention than do any other in Southern California, but in return are most profitable.

To commence at the stump—we have no stumps, by the way—the raw land suitable for growing the orange, which is very choice as to soil and location—the lemon even more so—will cost (on an average) $150 per acre, including water, which should be the first and greatest consideration. To plow, level, plant, and care for during five years, will cost $200 per acre, making the total outlay (labor all hired and trees bought from first class stock) $350 per acre. (Taxes, interest on money, and incidentals are taken care of by the few oranges and lemons produced.)

Trees should be planted twenty-four feet apart quincunx for budded varieties and at least thirty feet for seedlings.

Ten years ago a young man came to Los Angeles County from a large city in the East; his hands were only calloused by using the pen in an office business, which was both pleasant and remunerative; but health was a greater consideration. California, the wonder land, whose climate has allowed so many to regain health and happiness, was to be the future residence of our friend and his young and devoted wife, and the dream of owning an orange grove was soon realized. Health restored, ten years of unalloyed happiness, and an interesting family to gladden their lives, with a bright, beautiful future before them.

This young "city chap," who had never thought of being a farmer or horticulturist in the East, was soon busily at work, and the more he worked the more infatuated he became with his ranch of twenty-nine acres (everything above a garden tract is called a ranch nowadays).

His place had three hundred and fifty orange trees, eight years from the seed, imperfectly taken care of. He immediately set out eighty-eight trees five years old, and the following year (nine years ago) eight hundred more trees, five years old, were planted, making a seedling orchard of one thousand two hundred and thirty-eight trees, planted thirty-three feet each way.

Five years ago eight hundred Washington Navel trees (three-year old stocks) were planted between the rows of the above, and adjoining these were planted five hundred and fifty budded trees (five-year old buds on three-year stocks), mostly Washington Navels, including two hundred Valencia Lates, a few St. Michael and other varieties, making an orchard of two thousand five hundred and eighty-eight trees, occupying twenty-nine acres.

This orchard has an independent water-right, furnishing all the irrigation necessary, and at the command of the owner, so that he can use it when wanted (too much irrigation is worse than not enough). The owner gives his personal attention to all details—at the start doing much of the work himself—has made a study of citrus culture, and has given the whole matter intelligent and industrious attention, from the planting to the marketing, and the banking of the proceeds.

Besides home consumption and the generous donation of many boxes to his friends, we find that his crop foots up as follows:

Seventeen carloads—five thousand one hundred boxes—of oranges were shipped from this place of twenty-nine acres, to which may be added three hundred boxes of lemons, grown on eighty trees on three quarters of an acre.

This crop was shipped through the Orange Growers' Protective Union, the books of which verify these figures, and sold without the loss of twenty-five boxes to the owner, and brought him $12,750 for the crop, F. O. B. (The lemons brought $750 of this amount.) With proper handling, as in the above instance, the lemon is more profitable than the orange.

The care of this place, in common with others, involves many details to be attended to besides the cultivation, irrigating, and pruning, of all which our friend has kept an accurate account, and according to his books the total expense is, in round figures, $20 per acre. The picking, packing, boxes, paper, and delivery at depot ready for shipment cost 40 cents per box.

A summary of the receipts and expenditures gives us the following results:

Receipts.		
Twenty-nine acres oranges, gross receipts		$12,000 00
Lemons, gross receipts		750 00
		$12,750 00
Expenses.		
Twenty-nine acres and care of same	$580 00	
Five thousand one hundred boxes oranges, expenses 40 cents per box	2,040 00	
Three hundred boxes lemons, expenses 40 cents per box	120 00	
		2,740 00
Net profit		$10,010 00
Net profit per acre (nearly)		350 00

The statement here given is taken from accounts of the owner of the twenty-nine acres, who is his own manager, and who gives his attention to all the details, when necessary taking hold with his own hands and pushing the work. Each detail must be carried out as directed, and where the workingmen do not understand how to do the work, the owner gives the necessary instruction. The figures given above are well known to the writer, from the fact that the crop was marketed through the Orange Growers' Protective Union.

This is not an exceptional case as to the results, as others have done as well, some better, but many not so well, a fact that can probably be accounted for from want of the same careful and intelligent attention to all the details of culture, packing, care, etc.

I have before me the account sales, as shown by the books of the union, of three carloads of three hundred and thirty boxes each, from one orchard, which are as follows:

Car No. 1, three hundred and thirty boxes oranges	$1,483 65
Car No. 2, three hundred and thirty boxes oranges	1,176 03
Car No. 3, three hundred and thirty boxes oranges	1,150 90
Net price realized, F. O. B.	$3,810 00
Average price per box, Car No. 1	4 50

Taking the same average yield as shown in the twenty-nine acres, as above, the results would show a profit per acre of $837.

I do not hesitate to state that an orange orchard of thirty acres, a part in lemons, properly planted and attended to, location and soil being suitable, will, on and after twelve years from planting, produce a net return to the owner of $10,000 per year. That such an orchard is well worth, if for sale, fully $90,000, or $3,000 per acre.

Southern California shipped during the past season, 1885-6, one thousand nine hundred and sixty-nine carloads of oranges and lemons, to which may be added, sold at home and by express, two hundred and eighty-one carloads, giving us a total yield of two thousand two hundred and fifty carloads, or seven hundred and twenty-six thousand boxes, and which realized, net, $800,000 to this section.

CO-OPERATION.

Coöperation is not an experiment, nor something new; nor is it in any way connected with socialistic or labor organizations, as many seem to think. It is a very plain proposition, or plan, whereby two or more persons unite energies, muscle, brains, or money, for the good of all, the benefits going to each, according to the service rendered or money expended.

Coöperation is organized self help by honest labor and honest trade; the profits being equitably divided among those who create them, whether by work of hand or work of brain. It means concert for the diffusion of wealth, and leaves no one out who helps to produce it. It touches no man's fortune; it seeks no plunder; it causes no disturbance in society; it enters into no secret associations.

"In union there is strength." "It is by concert in industrial operations that wealth arises, rather than from individual isolated exertion." Since the workingman is one of the instruments in creating the wealth, he ought to get a reasonable share of it.

In 1882, England had one thousand three hundred and forty-six coöperative societies, with six hundred and sixty-one thousand members, having an aggregate capital of $38,000,000. The gross business for the year was $130,000,000, at a profit of 10½ per cent on the business done, or a net profit of 26 per cent on the capital invested.

One of the most successful coöperative stores in the country is that of the Arlington Coöperative Association at Lawrence, Massachusetts. The eighth quarterly statement is an exhibit that any business might be satisfied with. The number of members on October 1, 1886, was three hundred and fifty-one, and the share capital paid up was $5,755. The average capital in use for the year was $3,840. The total sales for the year ending October first, were $45,384 94; the gross profits, $8,060 51; the expenses, including salaries and interest, $4,209 19; the net profits, $3,770 32; the dividend divided among purchasers was $3,118 40; the amount carried to sinking fund, $651 92; the interest paid on capital, at 5 per cent, $192 07, and the total return on the average capital employed was $3,962 39, or $103\frac{19}{100}$ per cent. The gross profits were $17\frac{76}{100}$ per cent on sales. The members are those who own share capital, and share capital receives only 5 per cent interest. All profit is distributed among purchasers in proportion to their sales. Purchasers who are not members are allowed one half the percentage of dividends that members receive. Any one may become a member by paying $1 towards a share, and then leaving his dividend on purchases to his credit until the share is paid for. In this way, families that never before had saved a cent, and were habitually in debt to the grocer, are accumulating capital. Members perform a great deal of the labor without pay, and so keep the expenses down.

Senator Stanford in a speech delivered in the United States Senate said:

> In a large sense, civilization itself rests and advances on the great principles of coöperation. So the organization of individuals for a common purpose gives the strength, the capacity, of the ablest to all in the association. The weakest, and the one of the least capacity, is brought in advantages to the level of the best. The result of this association is to bring the individuals of the association closer to the entire fruits of their united

> industries. With a greater intelligence, and with a better understanding of the principles of coöperation, the adoption of them in practice will, in time, I imagine, cause most of the industries of the country to be carried on by these coöperative associations. The coöperation of individuals in kindred pursuits would have the effect of furnishing, from their variety of labor, continuous employment. Thus a combination of men could even do farming—rendering for hire their services to the farmers—and might find that continuity of labor so important to the laborer and conducive to the maximum power of production which arises from constant employment.

To bring coöperation nearer home, it will be evident to any thinking person that there is no branch of industry to which that system may be more successfully applied than to fruit growing. To begin, the land required for a colony may be purchased, by a number of persons acting in concert, at from 25 to 50 per cent less than the price at which a small tract could be obtained by an individual. Then the preparing of the land and the planting may be carried out very economically, and those who wish to continue their regular occupation at home, until their land begins to pay a profit, may do so, as was the case with the original Anaheim colonists. When the fruit begins to ripen, the greatest benefits of coöperation become evident. Canneries and fruit driers may be established by the colonists, favorable rates secured from transportation companies, and arrangements made to reach the most profitable markets, thus rendering fruit growers independent of the middleman, who usually succeeds in getting away with the bulk of the profits.

The work done by the Orange Growers' Protective Union, of Southern California, offers a good example of the benefits of coöperation, as applied to fruit growing. Oranges, for several years, brought such low prices that it did not pay to produce them. Recognizing this, a majority of the growers organized, two years ago, under the above name, established headquarters, which furnished information as to the best methods of caring for, packing, or shipping the fruit, the state of the various markets, and directing the consignments so that there should not be an oversupply in any one market. The result was that the union shipped over one thousand carloads, at an increased price, amounting to over a quarter of a million of dollars to the members, as well as securing a saving in freight that alone paid all the expenses of the union and returned $23 per car as a dividend to members shipping through the union. The present year the union adopted a resolution not to ship on commission, but to sell here at home. The result has been that nearly all the oranges of members have sold at most satisfactory prices. Under this healthful coöperation, orange growing has become the most profitable industry in the State, as well as the most fascinating.

The Grape and Wine Growers' Association, of Los Angeles City, that rented Mr. Rose's distillery, and united in making their grapes into brandy, have, by similar coöperation, received from fifteen to twenty-two dollars per ton for their grapes, whereas the ruling price was less than half these sums.

The coöperative colony recently established in Los Angeles County furnishes another instance of the possibilities of uniting capital and labor. The buying of seven thousand acres of land at $40 per acre and selling it to their own members at a very slight advance over the cost, will give many families good homes at moderate prices and secure a fund for further coöperative plans, such as educational institutions, stores, manufacturing, and other industries.

It is scarcely necessary to add that all these movements require singleness of purpose, energetic action, and honest and faithful work, without which any coöperative scheme must fail.

TREE PLANTING.

By O. S. **Chapin**, of San Diego, in "Semi-Tropical Planter."

Of all rural occupations it is questionable if there is another which possesses the degree of fascination, or yields the depth of genuine enjoyment equal to tree planting. Crops of annual production and brief existence may afford a passing gratification, but a few months sweep away all trace of our arduous service, and the round must again and again be repeated. In some sort one's life acquires a posthumous lease in the planting of trees, which, whether for ornament or profit, may thrive, continue, and wax great through succeeding generations, affording pleasure to the sight and ministering to material necessities.

In the early development of a new country, orchard planting naturally receives the more prominent attention, and to this department, and chiefly to the deciduous class of trees, the considerations of this article are directed.

Amongst the large number of new orchards planted each year, a considerable proportion are put out by persons who have had no previous experience in this work. With such, and others lacking proper knowledge, mistakes frequently occur, resulting in loss or disadvantage to the planter, and also in regret to the nurseryman, who, if right-minded, naturally wishes the best success of those who favor him with their patronage. In the haste usually attending the engagement and delivery of trees, there is seldom an opportunity to caution the purchaser regarding those details which, in planting, are essential to their future well-doing, and without attention to which even the best of trees cannot be expected to make satisfactory progress.

In view of this difficulty, the following suggestions are put in printed form for the benefit of those who may need advice. It is not possible within the compass of a few columns to present any considerable part of all that varied information which would be useful to the orchardist. It is here intended only to offer some practical hints, based upon well established principles, to serve as a guide in the earlier operations. Other knowledge, equally requisite, should be acquired through further study and observation. A subscription to the leading horticultural or agricultural journal of nearest publication will be money well invested, as thereby the local experience of others is made available, affording valuable aid and often preventing costly mistakes.

The possession of some standard general work, such as "Barry's Fruit Garden," "Thomas' Fruit Culture," or the elaborate and more costly "Downing's Fruit Trees of America," will furnish a wide range of information, supplying nearly every requirement. A special want of the Pacific Coast is met by "Garey's Orange Culture," "The Orange," by Spalding, and "The Fig," by Eisen, while excellent articles by practical men, treating on the olive, raisin culture, etc., have at various times appeared in the columns of periodical publications.

It is assumed that careful judgment has been exercised in the selection of ground suitable to the purpose of the planter. In this, depth of soil, fertility, drainage, and protection from prevailing heavy winds are always desirable, and where naturally lacking should, so far as practicable, be artificially supplied by manures, ditches, windbreaks of trees, etc. The question of water supply should not be overlooked; for while there are few places where with thorough cultivation the natural rainfall will not supply sufficient moisture to perfect good fruit in fair quantities, yet, on the other hand, there are few orchards in Southern California so advantageously situated but judicious irrigation will secure an increase in the product, affording more than compensating profit. It is sheer folly to ignore the factor of water in the agriculture of this country.

The proper selection of fruit for an orchard is dependent on considerations so variable as to preclude any uniform rule. For a family orchard, the list should include nearly the entire range of desirable fruits suited to the locality, with varieties succeeding each other from early to late, in order to furnish a supply of fresh fruit through as great a portion of the year as possible. For market, questions of demand, distance of transportation, etc., all have an important bearing. Discrimination is required according to whether dependence is placed on shipping, canning, drying, or household use in the home market; few kinds being equally adapted to all these purposes. A limited number of well chosen varieties will be found more profitable than a large diversity.

WHEN TO PLANT.

For deciduous trees, as a general rule, as early as practicable after the winter rains have come. In this mild climate the roots of a tree do not wholly share in the dormant condition of the buds. If a tree is properly transplanted early in the season, and a month later is taken up, it will usually be found to have formed a callous about the ends of the roots where the bruised parts have been trimmed away, and often masses of young rootlets will be seen extending from these and other parts. Early planting favors a thorough settling of the earth about the tree by the action of the winter rains, and by the time the buds begin to swell, the tree has measurably recovered from the shock of transplanting, and with new roots already gathering food from the soil, springs at once into vigorous growth. The late planted tree is more or less enfeebled by the attempt to grow before the roots are sufficiently developed to supply the demand for nutriment made by the expanding leaves. A brief, weak growth follows, often so completely exhausting the vitality of the tree that it is left without strength to resist the severe ordeal of summer heat and drought. Citrus trees are transplanted at various seasons, preference being given to one of its several dormant periods, occurring during the year. May and June is the time most preferred.

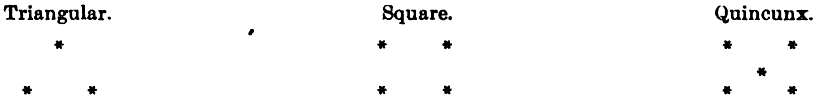
PREPARATION OF THE SOIL.

First, and always, let this be thoroughly done. Land which has before been cultivated is preferable. Like the cooking of food for animals, the working of the soil liberates crude gases and changes the nutritive principles to a form more readily assimilated by the plant. Do not turn under long stubble or other undecayed vegetable matter; burn or rake it away before plowing. If on new land, clean it of roots as much as possible. The decomposition of such trash generates fungus and gases poisonous to the tree roots, besides its presence through the soil furnishes avenues for the escape of moisture. Let there be a deep and complete pulverization of the soil by plowing, subsoiling (unless naturally free), cross-plowing, and such other means as will best accomplish the purpose.

It seems hardly necessary to remark that no manipulation of the soil should be attempted when it is in a wet, adhesive condition, or when so dry that the lumps will not readily pulverize. Any required leveling should be one of the first operations, and a condition of deep, perfect tilth the conclusion of all.

ARRANGEMENT OF THE ORCHARD.

In orchard planting there are three methods in most common use, known by various names, but probably best distinguished by the geometrical forms into which the trees thus planted are grouped, viz.:



Of these the simplest and most frequently adopted is the square. In this the orchard is laid off in lines crossing each other at right angles with equal intervals of space, and a tree planted at each crossing of the lines. As the roots of a tree are presumed to generally radiate from the trunk and extend an equal distance in all directions, they may be said to occupy a circle of ground. In such a case it is obvious that a disadvantage attends the square system by leaving an unoccupied space midway between each four trees, unless their roots overlap each other at the nearest point of juncture, which, in theory, should not occur. This can be easily illustrated by laying out four coins in a regular position. Now, take three of these coins, place them in the form of a triangle, with their edges touching. Observe the comparative reduction of this waste space, and an idea is given of the superiority of the triangular system. This, of all others, is unquestionably the nearest perfect. Without crowding the trees any closer, it secures 15 per cent more than the square to any given extent of ground. The larger number of persons who plant orchards do not fully appreciate this advantage. Let it be further illustrated: By the square system, at twenty feet apart, one hundred and nine trees are planted to each acre. Assuming their yield at mature age to average two hundred pounds of fruit to the tree, the crop would aggregate twenty-one thousand eight hundred pounds per acre. Planted by the triangular system, this same acre will support equally well one hundred and twenty-six trees, which, at the same estimated yield, would afford a crop of twenty-five thousand two hundred pounds per acre, or an increase of three thousand four hundred.

Considering the fruit is worth only the moderate value of 1 cent per pound on the tree, and the gain by the adoption of the triangular system is shown to be $34 per acre. This is essentially clear profit, as the cost of land, expense of cultivation, and the amount of taxes, are the same in either case, the only difference being in the cost of the increased number of trees, and the expense of their planting. Apply this computation to a ten-acre orchard for a term of ten years, and $3,400 is shown to be the not unlikely sum which a fruit grower may sacrifice rather than incur a little "bother" at the beginning. This system is of equal advantage in vineyards and small fruit plantations, and it affords superior facilities in all operations of cultivation and irrigation. It is sometimes called the "sextuple" system, from the character of a larger group which it forms, in which six equidistant trees stand in a circle about, and also equidistant from a seventh occupying its center. A gross error has occurred in the frequent application of the name "quincunx" to this method.

The true quincunx is described by four trees planted at the angles of a square, with a fifth placed midway between them. It is chiefly used in planting with reference to a future thinning out of the trees of an orchard, when those designed to be permanent shall have attained a considerable size. In such case the central tree in each group of five is ultimately removed, having served a profitable season of production until the growth of its neighbors demands its room. Sometimes a dwarf, or small growing sort, is thus permanently planted, and in occupying the otherwise vacant space partially secures the advantage of the triangular mode. If extensive planting is to be done, the distance between the trees should be regulated by the habits of the kinds, as follows:

Apples and apricots, twenty-four to thirty feet.
Pears and cherries, twenty to twenty-four feet.
Peaches, plums, and prunes, eighteen to twenty feet.
Quinces and dwarf pears, ten to twelve feet.
Oranges and lemons, eighteen to twenty-four feet.
Olives and figs, twenty to twenty-four feet.

By skillful pruning nearly all kinds can be confined to a reduced space, and this is advocated by some, but demands more than average qualifications.

In a family orchard embracing various kinds, convenience in cultivating recommends the adoption of uniform distances adjusted between the extremes best suited to each. About twenty feet will be found a fair average. By alternating the larger growing kinds, such as apple and apricot, with the smaller, such as pear, peach, and plum, each will more nearly appropriate its natural proportion of space.

LAYING OUT THE GROUND.

An orchard is an object of public notice, and the neatness and precision of its plan and planting, or the reverse, will generally be taken as an index to the character of the planter. A well laid out and well tended orchard commands almost universal admiration, while nowhere is slovenly work more conspicuous. Before proceeding with the following details, the novice in planting is exhorted to content himself, if necessary, to work by faith, and not be dismayed if at the outset he fails to comprehend the reason for each direction given, or its importance. Simply begin at the beginning, follow the rules as laid down, and all will grow clear as the work proceeds.

Having decided upon the method and distances, now prepare to stake off for planting. At this point neither a proper pride in the appearance of the orchard, nor a regard for true economy of time and labor, will allow haste to interfere with accuracy. Be assured that an error at the beginning will almost certainly be the occasion of indefinite repetition, resulting in vexation and loss of time. Provide a sufficient number of stakes for the ground to be laid out. Where available, laths answer the purpose excellently. Procure a long wire, for convenience not exceeding eighty yards, and of sufficient size to bear a strain without stretching. Less than one sixteenth of an inch in diameter is unreliable, as also are rope and twine. Obtain two iron rings, large enough to slip over the stakes readily. Select a clear space on a building or fence and measure off thereon the distance the trees are to be apart. Drive a stout nail at each end of the space thus measured, leaving the heads projecting slightly. Now fasten one of the iron rings securely to one end of the wire, slip this ring over one of the nails and carry the wire to the other nail. Draw the wire taut, bend an angle over the nail, and at this angle fasten a small tag of cloth or other material easily seen, by means of a stout twine, well waxed and firmly drawn to prevent slipping. Have an attendant pass the wire forward, and hold this tag at the first nail while a second tag is located and attached as before directed. In like manner proceed until the other end of the wire is reached, to which another ring must be attached at the regular distance.

For clearness of illustration let the ring first attached be known as ring "A," the first tag as "1," and so on in order until reaching the second ring, to be called ring "B." Also for the same purpose it is assumed that the orchard plot ranges north and south and east and west in its boundaries, and that operations commence at the southwest corner.

To lay out on the square system, begin by driving a stake at the spot selected for the southwest corner of the orchard, and at the beginning of the first row of trees. This and all outside rows should be sufficiently removed from any fence or boundary line to allow room between for the turning of a team in cultivating. About one rod is usually enough for this purpose. Slip ring "A" over this stake, proceed northward with the wire, draw it tight and secure it on the line for the first row of trees by driving a stake through the ring "B," at the same distance from the boundary line as at ring "A." Now set stakes outside the wire by each tag, driving them firmly and using care that they stand upright, to facilitate proving the work when all the stakes are set. This first row constitutes a base line for the orchard. The south line is next to be located at a true right angle with the base. To obtain this, slip ring "B" off the stake, take up the wire by tag "9," which carry southward and hold against stake "4" of the base line, while the assistant seizes the wire at tag "4" and draws it to the southeast until the wire tightens and with the base line forms a triangle. In the angle at tag "4" set a stake, which thus should be due east of stake "1" of the base line, ranging with which last the correct direction for the south line is obtained. Now stretch the wire to the east by this range and stake at the tags as before. Next square the east line from the southeast corner, and set a stake for the northeast corner (in this instance omitting the intermediate stakes), carry the wire to the north side and stretch from the northeast to the northwest corner stakes. If from any inaccuracy the distance between the stakes does not correspond to the length of the wire, the northeast stake must be moved to the west or to the east to rectify. When all is correct, stake the east line in the usual manner. Now carry the wire across parallel with the base line; slip one ring over the second stake of the south line, and the other over the corresponding stake of the north line, and stake at the tags as before, for the second row of the orchard, and thus forward until the plot is filled. When this is done, glance along the rows in both directions, to detect and rectify any slight errors. Should the size of the orchard exceed the length of the wire, successive plots can be joined to cover any desired area. In such case care should be used to work from a corner, and in the direction corresponding to that first adopted.

For the triangular system, the wire must be differently arranged. Procure four rings for the purpose. First lay off the wire in respects as directed for the square method. Then attach to ring "A" another piece of wire, which, with a terminating ring, shall be in length precisely one half the distance between ring "A" and tag "1." The remaining ring lash securely to the wire midway between the last tag and ring "B." Let these rings be designated in their order of position, as rings "1," "2," "3," and "4." Lay out the base line or west row, as for the square, using rings "2" and "4." In case of orchards on the triangular plan, it is recommended that the base line be always located in a direction crossing that of prevailing heavy winds. By this means, the orchard presents a more compact front, and thus lessens the force of air currents among the trees. By beginning at the southwest corner, protection against westerly winds is secured. Square the south line and stake the southeast corner, but instead of staking the south line as before by the tags, stake by a measuring pole made of a length corresponding to the distance the rows are to be apart, viz.:

If the trees are to be apart—

10 feet—rows should be	8 feet 8 inches apart.
12 feet—rows should be	10 feet 2⅞ inches apart.
14 feet—rows should be	12 feet ⅞ of inch apart.
16 feet—rows should be	13 feet 10½ inches apart.
18 feet—rows should be	15 feet 7 inches apart.
20 feet—rows should be	17 feet 4 inches apart.
22 feet—rows should be	19 feet ⅝ of inch apart.
24 feet—rows should be	20 feet 9½ inches apart.
30 feet—rows should be	26 feet apart.

Locate the northeast corner as before directed, and stake the north line the same as the south. Slip ring "1" over stake "2" of the south line. and ring "3" over stake "2" of the north line and stake by the tags. Pull up both ring stakes, and move the wire for the next, or third row. In this case use rings "2" and "4;" stake and leave ring stakes standing. In like manner alternate the succeeding rows.

On perfectly even ground, the triangular system can be laid off by the use of an equilateral wooden triangle, each side being of a length equal to the distance between the trees. Lay off a base line as before; place two corners of the triangle against the first two stakes on the base, and the third corner will mark the place of the stake for the first tree of the second row. Next corner on the second and third stakes of the base, and stake the third corner for the second tree of the second row, after which further procedure will be easily understood.

On similar ground it can also be done by a system of intersecting half circles, as follows: In a long strip of board bore two holes, each large enough to receive the orchard stakes, and as far apart as the distance between the trees. Lay out a base as before. By means of the hole drop one end "A" of the strip over the first stake of the base, the other end "B" projecting at right angles. By means of a pointed stick, thrust through the hole at "B," or a slight projection attached to the under side of the strip by the hole, mark a quarter circle on the ground by swinging the end "B" to the second stake of the base, over which it is slipped. Release the strip from the first stake and describe a half circle by swinging the end "A" to the third stake of base. In like manner, swing the end "B" to the fourth stake of the base, and so forward. At each intersection of the marks set a stake, which denotes the place for a tree of the second row, which in turn forms a base for laying out the third row in like manner. Where only one person is available for the work, and for extended spaces, the strip is more easily handled than the triangle. On an irregular surface neither the triangle nor strip will work accurately, while the wire will be found adapted for nearly all situations.

For the quincunx plan, use the wire as prepared for the triangular. Lay off the base line and locate the corners, but stake the north and south lines by a pole of a length one half the distance the permanent trees, or those at the angles of the group of five, are to be apart. Then stake the ground precisely as directed for the triangular method.

Planted by the foregoing plans, an acre of ground in equilateral form will contain of trees at the given distances apart:

	Square.	Triangular.	Quincunx.
10 feet	436	500	831
12 feet	303	347	571
14 feet	222	255	415
16 feet	170	195	313
18 feet	134	154	247
20 feet	109	126	199
22 feet	90	103	173
24 feet	76	86	137
30 feet	48	56	83

NOTE.—In giving the distances of trees of the quincunx in the foregoing table, the fifth or central tree is not taken into account.

CARE OF TREES BEFORE PLANTING.

Trees are surest to be in good condition if taken from the nursery immediately before planting, and subjected to the least possible handling and exposure. In very many instances this is not practicable, and some expedient must be adopted. On receipt of trees, if they cannot be at once planted, open the packages, cut the bundles, and removing all packing material from amongst the roots, heel in the trees in a deep trench previously opened in some well drained, mellow soil, being careful that all the spaces amongst the roots are filled with fine, moist dirt. If from any cause any trees are shriveled, or lack in plumpness of bark and buds, bury them entire in damp earth for five to seven days, when, if not badly injured, they will usually be restored.

PLANTING THE TREES.

Before digging the holes take a strip of wood five feet long, cut a notch at the middle, and at each end bore a hole large enough to admit a stake. Place the notch against the tree stake, and set a short stake in the ground through each of the end holes. Pull up the tree stake, remove the strip, and dig the hole for the tree. If the ground has been well prepared this need be no longer or deeper than to admit the roots of the tree in a natural position, and allow the tree to stand at the same depth that it grew in the nursery. Replace the strip on the two stakes, and the notch over the hole will indicate the exact place for the stem of the tree.

The greatest pains will rarely prevent some roots becoming bruised or broken in taking up and handling the trees. Before planting cut all these away to fresh, sound wood, using a keen knife, with a drawing cut sloping from the lower side of the root to the upper. If branched trees, shorten the limbs to the third or fourth bud from the trunk.

Three or four well-balanced branches should be selected to form the head of the tree, and all others cut away. Some prefer to prune to a bare stem, and form the head anew. Cut to an outside bud, if you wish the branch to grow outward; to an inside bud, if it already tends to spread too much. Start the cut opposite the base of the bud, and let it slope upward and terminate even with, or very slightly above, the tip of the bud. Don't be afraid to cut back.

The root, if stronger than the top requires, will quickly cause a growth to balance; but if the top is too large for the roots, it will draw upon the vitality of the tree. Trees not branched, cut back to a proper height, to form a low head, which, for various reasons, is most desirable. Three feet from the ground is high enough. As low as two feet is still better. Protect the roots from drying influences at all times as much as possible, especially from wind and sunshine. Two persons can work together with best advantage in setting trees—one to shovel in earth, the other to hold the tree upright in the notch of the strip with one hand, and with the other hand work fine surface soil among the interstices of the roots, which last must be naturally spread out, and the topmost held up while the lower are being covered. Plant so that the trees will stand at the same depth as they grew in the nursery, after the earth has settled. Be sure to leave no air spaces in filling; and when nearly full tread down gently with the feet, and finish with a loose surface, leaving the soil about the tree some two inches higher than the general surface, as it will afterwards settle to the level. In late planting, or a dry soil, use a pail of water, when roots are fairly covered, to settle the earth amongst them. It is a good plan to set the strongest roots toward the prevailing wind, to steady the tree.

Don't put anything whatever but clean earth under or in contact with the roots. Manure, if used, should be on the surface, where the rains will carry its properties to the roots in the form of a liquid, which is the only way they can take it up. Coarse manure used in this way is further valuable as mulch, which by some means should be supplied to all young trees. It preserves a cool temperature for the roots, and prevents escape of moisture. Straw answers well, if used five or six inches in depth, and covering the ground to a foot or more beyond the roots.

SUNDRY RECOMMENDATIONS.

Map the orchard immediately after planting, for, if delayed, labels will become lost and confusion result.

Do not allow any wire or string attaching a label to remain about the trunk or a large branch, as it is frequently overlooked until the ruin or serious injury of the tree calls attention to its presence.

Set two shakes or pieces of board cornering on the south side of the tree, to prevent sun scalding of the trunk, and to protect from borers. When the branches extend so as to shade the foot of the tree during the heat of the day, these can be removed. If headed low, this soon occurs.

See that the trees do not lack for moisture. Do not water unnecessarily, but watch for the first indications of approaching dryness, then apply a liberal quantity of water, cultivate and give no more until needed. Anticipate the need long enough to prevent a stoppage of growth. Unless you can irrigate, do not yield to the temptation to plant something amongst your trees. If you can irrigate, hoed crops need do no harm, provided the fertility they remove is restored by manures. Regard every weed as a pump which works night and day.

Cultivate after each rain, to retain a store of moisture, and occasionally during the dry season to prevent its escape. Rub off buds starting in wrong places, and do not let the young trees stunt themselves by overbearing.

Bind up any bruises on the trunk accidentally made in cultivating or otherwise, with a mixture of clay and fresh cow dung. In removal of any large limbs, coat the wound with a solution made by dissolving one fourth pound gum shellac in a pint of alcohol, which may be kept in a well corked bottle, and is ready for use at any time, being applied with a brush.

Post yourself regarding noxious insects, that you may detect their first appearance and stamp them out before they overpower you.

Finally, study your business. Seek information from all sources, especially your orchard. Be assured that nothing can supply the want of personal vigilance and industry.

CONDITIONS OF CITRUS CULTURE.

The following very valuable paper was read by M. Baldridge, of Azusa, Los Angeles County, at a meeting of the County Pomological Society:

In no other department, perhaps, has there been so much loss of time, money, and labor, through failure to consult conditions, as in citrus culture. I have planted orange trees upon my place, believing that choice citrus conditions are very rare, much more so than has been generally conceded, and if developed for all they are worth, no such income as they will yield can be derived from any other source. In all the countries where I have traveled or that I know anything of, perfect citrus conditions are found only in a few favored localities. Claiming, as we have a right to do, that we are especially favored in the matter of citrus conditions, while we have them perfect, we must concede that we have them indifferent, the latter largely predominating in many localities. I claim for our own production a body that is a good deal of sweet and a good deal of sour in happy combination, unequaled by any other orange-producing country. Only in a single instance have I ever found elsewhere fruit that would rate up to our standard in this respect. That was on the table of Hon. John B. Harkin, a millionaire of Fordham, New York. Upon inquiry I found it was a Valencia orange from a famous orchard in the Indian River country, Florida. He said he had prospected long before he found it, and that he had not been able to get such fruit elsewhere in the State.

Almost every locality will grow an orange tree, but when the fruit comes to be colored and flavored, then comes the test of citrus conditions. If they should develop prime, then the result is a bonanza for the owner, because, as I said before, the area of territory realizing all the conditions requisite for the production of the choicest fruit is comparatively limited in any country, and no man can afford to cumber such ground with anything else. If something is lacking, indifferent fruit will surely be the result of the best endeavor, and so much of that kind will always be in the market that prices for it must rule low, while really fine fruit will always command a good price and find ready sale. I cannot see the slightest danger of the over-production of such fruit as our best conditions will give us. During the past year I have made careful examination of many places in this and adjoining counties for the purpose of ascertaining where the best results were achieved, and noting the conditions which produced them. I speak more particularly in reference to oranges, because so little, comparatively, has as yet been done in lemons or limes. I will only say in reference to the latter that they are more sensitive to cold, and almost entire exemption from frost must be secured for them to make them safe and profitable.

When an orange orchard is to be planted, the first business in hand is to consider the conditions requisite, and select a locality where they obtain. Land that has so much water in it so near the surface that irrigation will not be required is too cold and the fruit will have too much acid. Reject all cienega, adobe, or heavy clay that will not mulch readily, or land where there is clay, hardpan, or bedrock near the surface. On such land the trees will not be long-lived, and if great care is not taken to cultivate thoroughly just at the right time after every irrigation, gum disease, scale, and smut will cause infinite trouble. Avoid sweeping air currents caused by peculiar conformation of surrounding hills and mountains. Secure exemption from frost as much as possible. Avoid granitic sand where the granules are too large to be favorable for capillary attraction. Keeping in mind all these negative propositions, you will travel over a great deal of territory already planted in orange trees, from which the owners have in many instances derived much profit, but a careful inspection of the trees and the fruit on them will furnish conclusive evidence that the conditions are not what they should be. Scale and smut are troublesome, and little patches of wax on the trees show that gum disease has been there. The fruit is small and does not color well, and looking into the inside of the tree you will see hundreds of dead twigs. The leaves are small and have not the dark green, wax-like appearance you will find where conditions are perfect. It is only a question of time when all such territory will be abandoned for citrus culture. Most of it is royal vine land, and into vines it will go. Many of the owners seem to comprehend the situation. They are neglecting their orange orchards and moving in the direction of vineyard and other industries. It is not necessary for me to specify localities where such conditions obtain. They are easily found. It is much more difficult to find what we should select, viz.: a location well protected from wind; what is commonly termed quick land, or land that has no bottom. If fifty or one hundred feet deep, so much the better, pretty much alike all the way down—alluvial deposit—with so much sand in it that it will not bake and will mulch easily after irrigation, carrying sufficient marl to give it the requisite strength and to bring the water up by capillary attraction from the great reservoir below, which has been filled by the winter rains and summer irrigation. Some gravel is not objectionable. Such conditions will color and flavor the fruit to perfection.

Having found the locality where they are fully realized, and sufficient water to fruit the orchard when it comes to bearing, secure it and you have a basis of values which may be developed into a plant which will be perpetual in princely yield of income. Such land is worth, say, $125 per acre for mixed uses. The citrus conditions attaching to it are worth $500 per acre. The subsequent value of the property will depend upon its development in the direction of citrus culture. A friend of mine has just bought eleven acres of such land and planted it to orange trees. He says at the end of the first year he shall value the plot at $4,000; second year, $5,000; third year, $6,000; fourth year, $8,000; fifth year, $10,000. He says there can be no safer proposition in any business than that. At the end of five years from nursery these trees will yield him $1 each, and that would give him current interest on $12,000, some fruit before that time, and a rapidly increasing yield thereafter. But at every step from the seed to the fruit great care must be taken to make no mistake, if such results are to be achieved. Yet I presume there are those present who have seen them realized. [I will say this plot of two-year old Navel trees, one year from nursery, has sold already for $10,000.]

The first step to be taken is the selection of the trees. These may be had for from 25 cents up, but the best obtainable are cheapest always. No man can afford to make a mistake here, because it takes too long to correct it; and a wise discrimination is imperative when the foundation is to be laid upon which we propose to build. No other money is ever placed where return so large is expected from investment so small. In selecting a tree, bear in mind the well known fact that stock grown under certain conditions of soil and climate will be furnished with a much stronger vitality than that grown elsewhere. For want of a better name we will call it life principle. I am satisfied from my own experience and observation that stock grown from Tahiti seed will inherit this constitutional vitality in larger measure than that produced from any other source.

When the stock is four years old (three years if thrifty and well grown), I consider the conditions most favorable for setting the bud, because at that age the button has become so powerful it will push the bud six feet high the first year. This is very important, especially for a Washington Navel bud, as, if it does not go up the first year, it will grow laterally and curl downward, and it is difficult to put it up afterward. In support of my theory on this point, permit me to call your attention to two Washington Navel buds, one year old, ten feet high, grown in the Citrus Grove Nursery, near Covina. I venture to say such a growth has rarely, if ever, been seen on younger stock. The Lisbon lemon you see here also ten feet high on same stick, but yet not a year old, and this remarkable result has been achieved without stimulants of any kind. Natural conditions are always preferable, and the nurseryman and orchardist can afford some time and money in quest of such trees, and a locality which will in its normal condition produce them. It would seem hardly necessary to say that buds should be cut from no other than vigorous, healthy, bearing trees, and only the stronger buds in the stock selected. Yet I know that thousands of buds are set without much reference to the kind of tree, or what part of the stick they came from. I prefer to set buds in the fall. They are then well healed in and ready for the first growth in the spring. The most important feature in the budding is the tying. I would just touch the raw with wax, after slipping in the bud, before putting on the string. Then be sure the top is well secured. There is some difference of opinion as to whether the bud gets its vitality from the upward or downward flow of sap. I will say that I have often seen buds, loose at the bottom, living, while all I ever saw loose at the top were dead. I prefer to let the strings crease the bark pretty well before taking them off. As growth conditions are manifested I cut off the tree about four inches above the bud and cover with wax. When the bud is large enough to carry all the sap select a period of new growth and cut the stump off to a shoulder with the bud, cover again with wax that will hold good through winter's rain and summer's sun, and keep the wood alive until it is all healed in. I would select a bud set on orange stock. Lemon on orange will do nicely, but the converse will not hold good. The habits of the two are essentially different. The lemon has a perpetual flow of sap, while the orange stops to mature its wood and ripen its fruit. The orange, for this reason, should be ripened on the tree and the lemon should not. Select a bud with a true taper, like a carriage-whip, thrifty, and well grown—one that carries the white wood well up and rounds the cane well to top on yearling; very large leaves indicate a very strong flow. Select a bud that is clean without having been cleaned, from a locality where there has never been any white or red scale.

Having secured the best bud obtainable, we must now transplant it to the orchard. Here, again, conditions must govern. I prefer to do this at one year old, because it has much less top to cut away than it would have at two years old. The second year's growth on such a bottom is simply enormous, is inclined to mature wood and put on fruit, and has to be cut away if left in nursery, when, if removed to orchard, such growth as is wanted can be forming the permanent top, and the rest can be thumb-pruned away, without shock or check to the plant. I prefer cutting back in the early winter and stripping the cane pretty close. Then tip with wax every raw; then it is healed over, the tree recovered, and there is not much to do when planting time comes but to cut the top off. I like this method for another reason. The first growth is strongly inclined to be lateral, with a downward tendency. If that is taken off, the next growth will be nearly at an angle of 45 degrees, and the tree can be readily shaped to carry a heavy load of fruit. This method I consider a very important feature in the foundation of a tree, and never having seen it adopted or suggested in any of the books, I claim it as an original development, and solicit investigation. Five thousand such trees, planted in my own orchard last year, will verify what I claim for it. As to the time to transplant, again consult conditions, and be governed by them. Seasons vary very much. And it is not safe to name the day of the week or month. When the buds are swollen to bursting, and new growth just about to start, that is the time to transplant the tree. If this should occur in a locality where there would be danger of subsequent frost, it should be deferred until this growth has hardened and such conditions are again on. I presume some of you have seen green trees cut and hauled to wood-pile and young growth put out several inches long. The log that did that came from a tree which was in condition to transplant when it was cut. When you find the bud in this condition cut it back, and cut the tap root to hold it there. See that your ground is well prepared. Lay it off, and secure your force. I would plant twenty-four feet apart each way. Hence, everything in readiness, before you touch a tree, if a norther should come on just as you are ready, stop and wait till it is over. When the weather is favorable put some of your men to raising trees, some to digging holes, and one to hauling trees; cover with wet blankets as soon as out of the ground. If sun is shining and atmosphere dry, or you have far to haul them, I would grout them. When this is done great care should be taken to prevent the grout from drying or hardening on the fibrous roots. If the land is deep, marl and sand, as it should be, cut tap roots twenty-four inches. Dig holes thirty inches, and set crown roots six inches below dry earth.

Parties setting by contract say I am a crank on tamping. Never mind, my trees live and do well. I have no hobbies to ride. I will adopt another man's method when I see that he gets better results than I do. I have two tampers and one shoveler to each setting-board. One tamp-stick should be quite small to work among the roots. Tamp bottom solid up to crown roots. Then cover them, and one man tamps with his feet. A tank wagon should follow the setters, and give each tree a bucket of water. As soon as the water has disappeared, cover up with loose earth. Now the tree has what is indispensable—something to preserve the old life until the new life begins. One bucket of water at the right time is worth a great deal more than a flood a few days afterward. Your citrus tree cannot wait until you have finished the plot. Now stake the tree and tie it, otherwise the wind will move it back and forth, packing the earth on either side until a little space is opened all around the cane where the air can penetrate to the crown roots and evaporate the moisture; put a little straw, half-composted, on top before the hole has been quite filled; put a little earth on it to keep the wind from blowing it away. Now paper the trunk; it keeps the jack-rabbits from eating the tree; it prevents young growth from starting where it is not wanted, and, above all, it protects the bark from the reflection from the sand, otherwise the south side of your tree will be hidebound—the bark brown. Try it with your knife—it will not slip, and you will find free circulation of sap on the north side only. You must protect the trunk from the ground up until the foliage will do it.

Now the work is done. Ninety-five per cent of the trees will live, and make a growth at first-growth period after the trees are established in their new home.

Citrus trees should never be distributed ahead of the planters, or allowed to suffer a moment in any way, at any stage of the business, or a check will result. If severe, a stunt will follow from which it will be difficult to secure a good recovery. From this time on irrigate just enough to furnish the requisite moisture, and no more. Cultivate and mulch thoroughly after every irrigation. Never let a weed show itself in the orchard, and do not plant peas, pumpkins, potatoes, or anything else there, as many do.

And now a word in regard to pruning. I have seen orange trees pruned high and pruned low, and short and long. Nearly every man has a fancy of his own. The more foliage you have the stronger will be the life and growth of your tree. Control the growth, but do not destroy it until you can spare it. This you can do by pinching the ends. Never prune your tree in July, August, or September. Those of you who have lived in a timber country know that trees are sure to die if girdled at the proper time, while there are times when it fails to kill. Watch closely at all times for scale, and spray twice a year, whether you find any or not. You must destroy them or they will destroy you. It has been done, and whatever "man has done man may do."

In order to achieve the best results certain conditions are requisite in the orchardist himself. Spasmodic effort will not do. He must have continuity well developed, be willing to labor and wait for the good time coming. Perfect conditions, always maintained from the seed to the fruiting, is the price of the best results in citrus culture.

HINTS ON GRAFTING.

Too many who wish to graft trees, otherwise useless or not of sufficient merit to retain, have found a season lost solely because they omitted to provide themselves with the needful grafts at the proper moment. To work with prospect of success, tree growth should be a little in advance of the scions, and if these have been taken from off the parent trees and laid into the soil as if ordinary cuttings, they will remain dormant even after all tree growth has pushed freely. No doubt trade growers provide themselves with an ample stock of grafts seasonably, but grafting is much less resorted to in the case of young stock than formerly, and budding is preferable wherever possible. Buds must be full of excitement at the time of insertion, and union with stock and bud soon results. Were that not the case the bud would soon perish. On the other hand, a graft has so much of body and of hard wood in it that it will endure for some two or three weeks in an active state, even though union with the stock be not effected. When the stock is in fit condition for grafting, the scion is the same, and if the work is properly performed without doubt the uniting process follows rapidly. After all, it is just possible that the condition of the stock has most to do with the rapidity or otherwise of the process of union, for grafts are not easily killed until the season has considerably advanced.

While seasons and situations must govern the time for grafting appreciably, yet the middle of April is, on the whole, about the most favorable time. In the case of stout stocks it does not at all follow that the heads which are to be removed need remain on the trees till so late a period. If cut some six inches or so above the point at which the grafting is ultimately to be done, even during the winter, the stem will not appreciably suffer, and if freshly cut clean off lower down, just when the grafting is desirable, the stem will probably be found amply supplied with sap. Of course very much depends upon the extent and condition of the roots, but as grafts cannot for several weeks absorb all the sap created, it is evident that too powerful a flow early is not desirable. Later, when the union is perfect, and growth has resulted, the sap force can hardly be too strong, as a vigorous growth from the scions the first year means the foundation of a fine treehead later. There are literally tens of thousands of trees from five to fifty years old in the country which would be all the better for (and indeed would soon well repay) beheading and grafting. We have an immense number of apple trees, for instance, but how many of them either fruit sparingly or produce fruit that is almost worthless? How many, too, have become literally copse heads, so thick that pruning or thinning is a work of despair, and, even if done, would hardly be remunerative? In all such cases it is wiser to take the heads off to clean stems, and regraft with some other productive and meritorous kinds. The beheading does not check the root action of the tree, while the reheading, by grafting, literally gives renewed life and vigor to trees previously thought only fit to grub up. The robust growth on the tops, allied to healthy and vigorous leafage, reacts on the roots—inspires them, as it were, with renewed activity—and conjoined, a fine, productive treehead soon results. When so served, orchard or garden trees have a start which no newly planted young trees can hope to overtake. A stout stem, say six inches through, will easily take four strong grafts as big as a man's finger; and each one, throwing the first year stout shoots, forms a big head at once, which, in three years, becomes a large tree. Then fruitfulness follows quickly, also, for the root and head force is soon equalized. Of course, much then depends upon the sorts worked, as some are so much the more precocious than others, and some so much the more prolific, especially early kinds. We must not, however, be too anxious to get up everything good in fruits for the sake of securing precocious or free fruiters. We want some which will give us late keepers, high flavor, fine form, or other qualities having special market value. There is so much room for development, in ample culture especially, that too much stress can hardly be laid upon the importance of regrafting old and apparently worthless trees.

A very odd-looking object certainly is a newly grafted tree, which has some seven or eight branches all worked. After all, it is very doubtful whether that is the most desirable plan to adopt. As a rule, I think a clean stem, some four or five feet from the ground, to be preferable, in the case of standard trees, to many branches worked higher up. In the former case some four or five stout grafts only can be employed; but the sap force is concentrated, and the growth all the more robust. The resulting head later becomes the most handsome, while one the product of many branches always present an ungainly appearance. The work of grafting is simple enough, and when done not too far from the ground is very easily performed. A clean part of the stem is selected, and a clean cut with a saw is made, so as to obviate the tearing of the bark. A sharp knife is drawn from the top of the stem, four or five inches in length, and clean through the bark in as many places as the grafts are to be inserted. A specially prepared piece of wood, painted and flattened like one side of a clothes-peg, is prepared and driven in behind the slit in the back to open it. The graft, stout and of clean, vigorous wood, beveled on one side to fit the opening made, is driven well in, and then is secured by a bandage of stout bast; then clayed over and finished off neatly. Carefully done, the result may be looked for with entire confidence.

GRAFTING WAX.

Dr. Chandler used ten pounds resin, two pounds beeswax, two pounds tallow, and four pounds bar soap.

Mr. Coates gave his recipe as follows: Two and one quarter pounds resin, two pounds beeswax, and three quarters of a pound tallow.

Mr. Shinn uses one pound tallow (mutton tallow), two pounds beeswax, and four pounds resin.

Another member advocated equal parts of resin and beeswax, one quarter of one part of tallow, and a little boiled linseed oil, which makes a wax that adheres well, and does not break.

A LITTLE TURPENTINE.

Professor Hilgard stated that they put in a little turpentine at the University, which makes the wax pliable; and it hardens as the turpentine evaporates.

W. W. Smith, of Vacaville, proposed the following recipe for making grafting wax: One pound of resin, one half pound of beeswax, one and one quarter pounds of linseed oil, and two tablespoonfuls of turpentine. The scion should be cut in a wedge shape, and inserted in the stock at a shallow depth. After putting on the wax it is covered over with brick, just to avoid running by the sun, heat cracking, etc.

In grafting large trees do not cut the limb square off, but make a sloping cut, and then fold the bark back over the cut, and bind with a waxed cloth. Mr. Smith never had any success in grafting with scions after they had begun to grow. In budding he buds the apricot and the almond as well in the spring as in July; but the peach and other fruits do better when budded in summer.

In working the plum on almond stock, Petite prune does remarkably well. Some other plums succeed, and some do not unite well.

Mr. West said that in grafting vines that clay tempered with cow manure, to prevent cracking, was excellent for vine grafting.

Mr. Hatch spoke of a man who used a wax, chiefly resin, with powdered charcoal added. To keep the wax in a pliable condition while using, an appliance was improvised to carry the wax over a smouldering fire; and he put on the wax while quite warm. Asphaltum has also been employed in grafting with success.

Dr. Chandler cited another man who used asphaltum, with bar soap added; and the whole cost only about 4 cents per pound.

James Shinn, of Niles, was of the opinion that in the case of cherries, peaches, and apricots, budding was preferable to grafting, for the reason that if a graft failed a second attempt could not be made until the following year. On the other hand, if a bud should fail, the horticulturists were enabled to take a second chance by grafting. He believes that, as a general rule, grafting could be made successful at a much later season of the year than the farmers at present attempt.

Bulletins No. 4 and No. 6, on Winter and Summer Remedies, issued from the Office of the Inspector of Fruit Pests.

BULLETIN NO. 4.

WINTER WASHES RECOMMENDED BY THE STATE INSPECTOR OF FRUIT PESTS.

The publication of the biennial report being somewhat delayed, it has been thought advisable to give a short extract of the chapter relating to such remedies as are applicable during the *dormant season.*

The most successful winter wash against the armored scales, such as the *Perniciosus* scale, *Aspidiotus perniciosus*, the greedy scale, *Aspidiotus rapax*, and even for the oystershell bark louse, *Aspidiotus chonchisormis;* the best protected of all have proved to be those containing part soda and part potash lye.

From personal experience we recommend two formulas of this kind:

1 ℔. of solid concentrated American lye, or	80 per cent.	Any one of these to 1 ℔. of commercial potash, 52 per cent.
⅘ ℔. of powdered caustic soda, or	98 per cent.	
1 ℔. of powdered caustic soda, or	76 per cent.	
1¼ ℔s. of powdered caustic soda, or	63 per cent.	

To be dissolved in 2½ gallons of water.

This proportion was, I believe, first recommended by Mr. M. Cooke, and has, in all cases which have come under my observation, proved very successful.

ANOTHER FORMULA,

Recommended by Professor Hilgard, is undoubtedly equally good, but I have not had an opportunity to see its results, except in one or two cases. As will be seen from prices given below, it will cost about one cent a gallon less than the above.

1 ℔. of solid concentrated lye (American), or	80 per cent.	Any one of these to ½ ℔. of commercial potash, at 52 per ct.
⅘ ℔. of powdered caustic soda, or	98 per cent.	
1 ℔. of powdered caustic soda, or	76 per cent.	
1¼ ℔s. of powdered caustic soda, or	63 per cent.	

To be dissolved in 2 gallons of water.

PRICES OF ALKALIES.

The prices of soda and potash vary considerably. Caustic soda is high just now: Greenbank, 98 per cent, is worth 9¼ cents in cases of 240 pounds; in small lots, say 10 pounds, 10 cents per pound.

Caustic soda	76 per cent.
Caustic soda	63 per cent.

Concentrated (solid) American lye, 80 per cent, is sold at about 7¼ cents per pound.

First sorts of potash (commercial potash), containing about 52 per cent of caustic potash, 6½ cents, in drums of 600 pounds; small quantities, 9 cents.

THE BEST KIND OF WEATHER FOR APPLYING ALKALINE WASHES.

The vast difference in results with alkaline washes—notably with those containing soda alone—are due not alone to their very varying strength, but to atmospheric conditions also. We quote Professor Hilgard:

> In examining trees that have been sprayed with soda lye alone on a sunny day, it will sometimes be found that within an hour after the spraying, the dry portions are covered with a network of small, white needles, resembling white frost. These needles are simply solid carbonate of soda, and show that by the action of the dry air the "causticity" of the lye has been quickly destroyed. The bland, common, sal-soda has taken its place, and the action is practically at an end..
>
> #### FOGGY WEATHER THE MOST FAVORABLE.
>
> It is quite otherwise when the spraying has been done on a moist or foggy day, or late in the afternoon, so that the lye remains in a liquid condition. It then goes on working for many hours, eating away the edges of the old scale, and finally reaching to the old insect or eggs inside; and, should favorable weather continue, the toughest old inhabitant may thus be destroyed in a single application.
>
> #### ADVANTAGES OF USING POTASH.
>
> The use of the potash compounds in connection with the soda lye aids materially in maintaining the active corrosion more or less independently of moist weather, by preventing the rapid evaporation and solidification that so often puts a premature end to it. Moreover, the potash compounds so used, ultimately reach and remain in the soil, and act as a fertilizer when needed, so that the money spent on them is not gone with the insects.

MODE OF PREPARING WASHES.

The easiest way to prepare the alkali washes, especially the solid concentrated lye, is by suspending the material in a barrel of water, either putting it on a perforated piece of tin or into a sack. Being thus suspended, the diffusion is quite rapid, and the material will require but little looking after. By using hot or boiling water, the action of course is hastened very much. When dissolved thoroughly, each kind having been kept separately, they are mixed and stirred well, so that they become thoroughly mixed. The liquid should be strained through a fine sieve (brass) or a cloth, so that no clogging is possible when the wash passes through the nozzle.

The San José nozzle has been and is being very generally used; but for lye washes it is, in my opinion, inferior to the Imperial and the Cyclone. The latter has the advantage of throwing the stream better on the underside of branches and foliage. When a pump with two outlets is at work the two kinds of nozzle may be used to advantage. One man may work principally on the upper part of the tree with the Imperial (because its spray being thrown straight, hits the more vertical branches squarely), while the other man will reach the lower more horizontal branches better with the Cyclone spray, carrying, as it does, either upward or downward.

HOW TO PREPARE THE TREE FOR SPRAYING.

If large trees, say over twenty feet high or even less, are to be treated, it will be found the best policy to cut them back to reaching distance, otherwise the probability is that part of the tree will not be reached. Likewise it is necessary to cut away such limbs as are preventing the free movements of the workmen. For trees of all sizes we prefer the pruning of all the heavier limbs first, and the complete thinning of the trees, leaving the leading shoots uncut, to avoid the possible danger of the killing back of buds which were intended for next year's growth.

Badly infested trees, when the scales are layers thick, may need two treatments, with an interval of ten days.

CAUTION.

Owing to the advanced condition of peach trees in early sections the strength of alkali cannot be used without running the risk of sacrificing the fruit buds.

The strength given in both formulas should not be used on any trees after the buds have commenced to swell sensibly; and in almost all sections, except in very late ones, the wash should be finished by the end of February.

ACTUAL COST OF SPRAYING.

Putting the cost of material per gallon at 5 and 6 cents, respectively, ½ cent for preparation, making 5½ and 6½ cents, we find that a tree, say six to seven feet in diameter, and eight to nine feet height of crown, will require about one gallon, and the cost of application will be 6 to 7 cents, we have a total cost of 13 cents per tree; larger trees in proportion.

We have endeavored to find a plain and easy mode for testing commercial lyes. There does not seem to be any which can be used by any one. We recommend that the purchaser demand of the sellers to see their Custom House certificates, which will indicate the strength of the lye. He will then at least, know what strength has been received. We shall have to rely greatly upon the honesty of dealers. The so called lye testers are really misleading, except when we deal with pure articles. As they only test the density of the liquid, soluble salts or other inert substances may be present without being discovered by this test.

WOOLLY APHIS.

For the subjection of this most troublesome and widespread enemy of the apple treee, a number of years' experience has convinced us that gas lime (used with moderation), the refuse from gas works, is both a lasting destroyer of the insect and a fertilizer. Use from one and a half to two shovelfuls of fresh gas lime per tree, spreading it over the surface around the tree to cover about six feet in diameter. If the soil is deep and well drained, a much larger quantity may be safely used. Care should be taken not to pile the gas lime around the neck of the tree, as the solution of gas water formed by the rains might scald the bark. To prevent possible migration from the roots to the upper branches, place a shovelful of fresh ashes around the base of the tree. The dressing with gas lime should be done as early as possible, that the rains may have full effect on it and carry it into the ground. For the form of woolly aphis infesting the top, the daubing of kerosene on the infested knots is a fair remedy; washing, especially in the summer, with the summer wash recommended in Bulletin No. 3 (see forthcoming report). However, when the red ladybugs are numerous, we prefer to trust the extermination of the aphis to them.

CODLIN MOTH.

The fighting of this insect must be principally done in the spring and summer, the line of defense being indicated in my report. The winter work must consist in reducing the hiding places for the cocoons. As these are often found many inches below ground, the soil should be removed and bark scraped. If the trunk has very rough bark, it should also be scraped, and if it is covered with lichens or moss, give it a spraying with a weak lye solution, half the strength of what is indicated above.

PEACH MOTH (*Anartia lineatella*).

The first brood of worms bore into young limbs of peach trees, the second into the fruit. The bulk of the pupæ evidently harbors in the ground, and dusting with gas lime, about in the same manner as for woolly aphis, might prove a remedy. Any infected limbs should be cut off and burned, and no hiding places for them allowed. It is in the spring that they show their work most plainly, by the withering young shoots. These must be cut off and destroyed.

COTTONY CUSHION SCALE (*Icerya purchasii*).

For all deciduous trees, such as locust, which is much subject to this pest, we recommend one fourth of a pound of concentrated lye, one fourth of a pound of whale-oil soap, to one gallon of water. Before treating the tree cut off the tops down to the main branches and burn them. For evergreens the summer wash recommended last summer is useful, and will not hurt healthy foliage. Dissolve thirty pounds whale-oil soap (80 per cent soap, at the most costing 5 cents per pound), in sixty gallons of water, by heating the two together thoroughly. Boil three pounds of lye (American concentrated lye is what we have used) with six pounds of sulphur and a couple of gallons of water. When thoroughly dissolved it is a dark brown liquid (chemically sulphide of soda). Mix the two, the soap and the sulphide of soda, well, and allow them to boil for about half an hour, then add about ninety gallons of water to the mixture, and it is ready for use. Apply it warm, at about 130° F., by means of a spray pump. Used warm its effect is better, and less material is required than when cold. It must, however, be remembered that the minute scales are especially numerous on the under side of leaves. This fact makes the extermination on a large tree in full foliage almost next to impossible. Only small trees may be successfully treated in this way. Large trees must be either deprived of their foliage or cut down to a few limbs. Neither of these methods can be safely applied on tender trees during a season when sharp frost may be looked for. A spraying should, however, be done, as it will check their spread most effectually. Too great pains cannot be taken in removing infected limbs, as the insect spreads often in this way. A canvas should be spread around the tree, so that none of the insects can escape. When the tree has been treated, spread hot ashes around its base and apply tight-fitting bands smeared with a greasy substance around the trunk to prevent any insects reascending.

BULLETIN No. 6.

SPRING AND SUMMER REMEDIES AGAINST THE CODLIN MOTH.

It is needless to write at length about the ravages of the codlin moth, and of the importance of finding a thorough remedy against the pest. In a paper read before the Fruit Growers' Convention, held in November last, I expressed the belief that spraying with arseniates were the most promising of anything yet tried for this purpose. I also maintained that while the remedy doubtless would prove efficacious, killing the codlin larva if used often enough, it would be a little premature to recommend it as *the remedy*, because of the very poisonous nature of the compounds, and that we needed a thorough trial to settle definitely the all-important question if either of the arseniates would be of any danger to the consumer of fruits so protected. Since expressing this, I have been in active correspondence with the State Entomologist of Illinois, Prof. S. A. Forbes, and I feel happy to state that his thorough experiments, although made on a comparatively small scale, have proved to my mind that in the climate of the Eastern States, the arseniates can be made a decided success by proper application, thereby saving two thirds of an apple crop, and that there is no danger in using them in that climate, that is, if used in season. The Bulletin, No. 1, of Professor Forbes, was kindly sent to me, and I have freely quoted from it in the following. Professor Forbes has reached the following conclusions: That the results of once or twice spraying with Paris green in early spring before the young apples had drooped upon their stems, resulted in a saving of about seventy-five per cent of the apples exposed to injury by the codlin moth.

The arsenic remedies have, to my knowledge, been used by several persons in this State, but while they have been more or less successful, yet, except in the case of apples sprayed with arsenic solution by Messrs. Settle and Ousley, in the Santa Clara Valley, as mentioned in my paper, no official analysis has been made of fruit treated with arsenic. These apples were found perfectly free from any trace of arsenic, although sprayed twice, and in the case of Mr. Ousley fifty per cent of the fruit saved. It must, however, be borne in mind, that while arsenic, or arsenious acid, is very soluble, in fact is dissolved by the least moisture, Paris green and London purple are not, and will remain on the fruit even after heavy rainstorms, as has been proved by recent analysis, in Illinois. Hence, these must be regarded as *decidedly dangerous when used late, when the apple has size, and is hanging down.* It seems that it is the actual growth of the apple that throws off the poison, as none have been found on fruit treated early, in the eastern climate. If there be any possible danger from the use of these substances, it will be determined definitely, and we shall bear this point especially in mind, in our experiments this summer. We ask every one disposed to experiment, to note carefully the time and manner of application, the condition of the fruit sprayed, and also the state of the weather. A number of samples of fruit thus treated and analyzed, will settle the question of the danger to the consumer.

PARIS GREEN.

Paris green is a compound of arsenic and copper. It is a far more powerful poison than arsenic alone, and is not soluble in water, hence will remain much longer on the trees. As stated before, in the Eastern States it is used in preference to arsenic, as it is not so liable to be washed off by rain; and another advantage is that it will not hurt the foliage, except when used in an overdose. Such at least is the report from the East. I have taken considerable pains to ascertain if any damage has resulted from its use in this State. I have learned recently, on a visit to Contra Costa County, of Mr. Treat, that peach trees treated with Paris green for the purpose of killing diabrotica beetle, suffered severely, but used upon apples and pears it had no bad effect. Doubtless it will be found that Paris green in market will vary in strength; the proportion to be based on the percentage of fifteen per cent arsenic. The price of Paris green in San Francisco, by the small quantity, is twenty-five cents per pound.

PROPORTIONS USED.

One pound Paris green to fifty-four gallons water is the strength used by Professor Forbes for his successful experiments. Other parties claiming to have been equally successful have used only half the strength. The Paris green is stirred and mixed with the water and kept constantly stirred while being sprayed.

LONDON PURPLE.

London purple is another arsenical compound. It is the residue from the manufacture of aniline dye, and contains lime, arsenious acid, and carbonaceous matter. It is more soluble, more adhesive, less poisonous, and less expensive than Paris green.

This compound in San Francisco is worth, by small quantities, twenty-five cents per pound, and by larger quantities, twenty-two and one half cents. It is mixed to a paste and then diluted. Professor Cook, of Michigan, recommends one pound to fifty gallons of water; others, as little as one pound to two hundred gallons. We intend to try these different strengths ourselves, but should not recommend less than one pound to two hundred gallons. As the compound contains some arsenious acid, it would be advisable to use it on cloudy days if possible, as it might damage the foliage.

Analysis of Paris green made by Mr. A. Weber, University of California, through the courtesy of Prof. E. W. Hilgard:

No. 2	55.7 per cent arsenious acid.
No. 3	38.3 per cent arsenious acid.
No. 4	54.4 per cent arsenious acid.

Analysis of London purple made by Dr. E. Schneider for the State Board of Horticulture, two samples:

No. 1	44.16 per cent arsenious acid.
No. 2	34.00 per cent arsenious acid.

WHITE ARSENIC, OR ARSENIOUS ACID.

One pound to two hundred gallons of water, the arsenic being first dissolved by being boiled with caustic potash. Experiments with this compound in Santa Clara accomplished considerable good, and, it is plain, without any danger to the consumer; but in nearly every case the foliage of the trees has been damaged—in some cases badly, in others partially; and in only one case, where the application was made during the morning of a cloudy day, no damage was caused to the tree. Although less promising than any of the other remedies, it deserves trial.

MANNER OF APPLICATION.

It is of great importance that when applied the poison be well mixed in the water, and in the case of Paris green and London purple it is necessary to select such nozzles as do not clog. The mixture should be thrown over the tree so that every apple or pear is wetted, as it is by actual poisoning of the fruit that the egg or worm is killed. Thrown with a fine spray, two and one half gallons of the mixture will suffice for a large apple tree.

TIME OF APPLICATION.

For reasons before mentioned, it is essential that the poisoning be done early. The first application should be made when the fruit is just out of bloom. The second, ten or twelve days afterwards. If a third application be made—but it is to be hoped that would prove unnecessary—it should be done later than four weeks after the first.

MEASURES TO CATCH THE LARVÆ.

Banding system.—This mode of protection, which has been practiced in the Eastern States, has been tried in this State more than any other. Its usefulness is based on the observed habit of the larvæ when leaving the apple to seek shelter under the bark. The band about the tree provides artificial shelter for the worm, and the majority of the larvæ no doubt find their way to this; but a sufficient number for giving future trouble find other hiding places on fences, buildings, etc., and perhaps more than anywhere else under clods at the foot of the tree; and it is here in an old orchard that I have almost invariably found cocoons. To make the banding system more effective, the ground right around the tree, as well as the whole orchard, should be thoroughly pulverized. The greatest obstacle to the success of the banding system is the neglect of one orchard owner, while his neighbor conscientiously and thoroughly performs the work. The neglect or half-done work of one person among his trees is sufficient to counterbalance the attentive and thorough work of many others around him. The difficulty, in so many cases, of doing anything really satisfactory, I think is due to this want of coöperation. In my own orchard, in the Santa Cruz Mountains, comparatively isolated, very fair results have been obtained. It is evident that in a thickly settled community, unless all concerned do their duty, the work will be largely in vain.

PICKING OFF INFESTED FRUIT.

The practice of picking off infested fruit, of course, comes under the same head as the band system. In that it aims at a reduction or extermination of the next brood, it should go hand in hand with the band system. It is also open to the objection that unless the neighbors do their duty, little good is accomplished.

Whenever feasible, the custom of keeping hogs in the orchard is a good one, as in this manner all the wormy fruit is devoured, this naturally greatly preventing the increase of the moth.

Bulletins No. 3 and No. 5 will be found in the report.

PROCEEDINGS OF THE STATE BOARD OF HORTICULTURE

ON APRIL 13 AND 14, AND NOVEMBER 17 AND 19, 1886 (INCLUDING THE PROCEEDINGS), OF APRIL 16, 1887, AND OF EXECUTIVE COMMITTEE ON JUNE 30, 1887.

OFFICE OF THE STATE BOARD OF HORTICTLTURE,
April 13, 1886.

The Board met at eleven o'clock A. M., President Ellwood Cooper in the chair.

There were present Messrs. Ellwood Cooper, A. F. Coronel, General M. G. Vallejo, Dr. E. Kimball, N. R. Peck, Wm. M. Boggs, G. N. Milco, and A. H. Webb, Secretary. Absent, Hon. H. C. Wilson and Dr. S. F. Chapin.

The minutes of the preceding meeting were then read and approved.

The Secretary then read a letter from the Trustees of the City of Sacramento, requesting the appointment of Mr. Thomas Colbourn to the office of quarantine guardian for that city.

On motion of Mr. Boggs, the request was granted and Mr. Colbourn appointed.

On motion, Dr. E. Kimball, A. F. Coronel, and N. R. Peck were appointed a committee to decide upon a time and place for the holding of the next regular meeting of the Board, and at the same time and place, and under the auspices and direction of the Board, the sixth annual State Fruit Growers' Convention.

The Secretary was then asked by the President as to whether there was any understanding by the Board at their meeting in April, 1885, as to the term for which the Inspector of Fruit Pests was then elected. Upon this subject there was a general interchange of opinion of the members present at the time.

Dr. Kimball then moved that Mr. Wm. M. Boggs—the Inspector of Fruit Pests—read his report, which Mr. Boggs proceeded to do, giving a detailed account of his extensive travels through the various fruit sections and an exhaustive treatise on the numerous injurious insect pests now infesting many of the fruit localities of the State, and recommending many useful and practical remedies for their extirpation, which had been used and applied in the sections visited by him. At the conclusion of this report, which was quite lengthy, Dr. Kimball moved that wherever the words *San José scale* appear, it be stricken out and its true name *Aspidiotus perniciosus*, substituted, and that hereafter this insect be so designated and not called as heretofore erroneously, the San José scale. This motion was unanimously agreed to; then, on further motion of Dr. Kimball, the report of Inspector Boggs was unanimously adopted.

On motion, the Board took a recess until one o'clock and thirty minutes P. M.

At half-past one o'clock P. M., the Board met as per adjournment, President Cooper in the chair, and all the members of the forenoon being present.

Dr. Kimball, of the committee appointed to select time and place for the holding of the next meeting of the Board and fruit growers' convention, announced that the committee had not been able to agree upon the city wherein should be held the next meeting and convention. Santa Rosa, San José, and Sacramento, were all anxious to secure the convention. As Sacramenio was the most central, he thought personally, that it should be held there; and, therefore, moved to that effect. This motion was seconded and strongly urged by Mr. Peck.

The President directed the Secretary to call the roll, and the members to vote as their names were called, with the result in favor of Sacramento.

At the request of Mr. A. L. Bascom, from San José, who had urged the selection of that city, the vote was made unanimous.

On motion of Mr. Milco, the time for the meetings was fixed on the fifteenth of November, at eleven o'clock A. M., and to continue one week.

The Secretary then read the annual report of the Treasurer, General M. G. Vallejo, which was approved and adopted.

The Secretary then read his report, which was also approved and adopted.

On motion of Mr. Milco, the Secretary was instructed to send to each of the members of the Board, twenty copies of the Report of the Fruit Growers' Convention at Los Angeles, and use the rest of the one thousand copies on hand for exchanges, etc.

On motion of Mr. Milco, the Secretary was directed to dispose of certain surplus materials on hand.

Dr. Kimball moved that a committee of three be appointed to draft rules and regulations in compliance with Section 5 of the Act of 1883, and that President Ellwood Cooper be the Chairman of said committee, which motion prevailed, and the President appointed as the other two members of the committee, Messrs. Kimball and Milco.

It was moved and adopted that Mr. B. M. Lelong be requested to favor the Board with his views on injurious insects, when that gentleman came forward and proceeded to explain the habits and injurious effects of certain insects, and also the nature and effect of certain insecticides, as shown on specimens of citrus fruits which he had brought from Los Angeles.

At the conclusion of Mr. Lelong's remarks, Mr. A. L. Bascom, the quarantine guardian of Santa Clara County, also addressed the Board.

At the conclusion of Mr. Bascom's remarks, the Board adjourned till to-morrow, at half-past ten o'clock A. M.

WEDNESDAY, April 14, 1886.

The Board met promptly as per adjournment, all the members of the previous day being present, and President Cooper in the chair.

On motion of Dr. Kimball, a committee of three was appointed, consisting of President Cooper, as Chairman, H. C. Wilson, and N. R. Peck, to make all suitable arrangements for the holding of the forthcoming meeting and convention at Sacramento, on the fifteenth of November next, the same to continue one week. But on further considering the subject, it was finally decided that as Mr. Boggs, as the Inspector of Fruit Pests, could do this without personal expense to himself, and that as no other member of the Board could do this except at his own personal expense, Mr. Boggs was added to the committee with full power to make all needful arrangements at Sacramento for the holding of the next Board meeting, and annual State Fruit Growers' Convention.

On motion of Dr. Kimball, the Board then went into executive session.

On motion of Dr. Kimball, seconded by Mr. Boggs, reporters of newspapers were permitted to remain.

Mr. Boggs then addressed the Board, and, after giving certain reasons therefor, tendered his resignation as Inspector of Fruit Pests, to take effect on June first, following.

Whereupon Mr. Milco moved that Mr. Boggs' resignation be accepted, and that the Board then proceed to the election of Inspector of Fruit Pests, to take office on June 1, 1886, to fill the vacancy; which motion was adopted.

The President then declared nominations for Inspector of Fruit Pests in order.

Dr. Kimball then nominated W. G. Klee. Mr. Milco spoke in favor of the nomination of Mr. Klee and seconded the nomination. Mr. Boggs nominated Mr. Lelong, of Los Angeles, and Mr. Peck nominated Matthew Cooke. On the first ballot Mr. Klee received three votes, Mr. Lelong received three votes, and Ellwood Cooper received one vote.

There being no choice a second ballot was had, with the following result: Mr. Klee received four votes, and Mr. Lelong received three votes.

Mr. Klee having received a majority of all the votes cast, he was declared duly elected to the office of Inspector of Fruit Pests, to take office on June 1, 1886.

On motion of Mr. Milco the Secretary was directed to telegraph Mr. Klee, informing him of this election, and request his immediate presence before the Board.

On motion, the Board took a recess till two o'clock.

Three o'clock P. M. the President called the Board to order, all the members of the previous session being present except Dr. Kimball, who was absent.

General Vallejo then arose and, addressing the President and members, referred to his long services as Treasurer, the arduous duties and responsibilities of the office, and declared his desire and purpose to resign the office of Treasurer, which he then did.

Messrs. Boggs and Coronel both spoke quite feelingly on the subject of their high appreciation of the valuable services of the General as our Treasurer, and of his great usefulness to the Board as Treasurer on account of his high standing and valuable services as a citizen, as well as being one of the first and most valued horticulturists of the State, and appealed to the General not to insist on his intended resignation, and this being the unanimous sentiment of the Board, the General was finally prevailed upon to withdraw his resignation, which he did.

On motion of Mr. Milco, the Board extended a vote of thanks to Mr. A. L. Bascom, the quarantine guardian of Santa Clara County, for his attendance on the Board, and the general information he had given respecting the fruit interests of Santa Clara County.

On motion of Mr. Peck, Mr. Lelong was requested to address the Board regarding the fruit interests of Los Angeles County, which that gentleman proceeded to do.

Mr. Klee now having arrived, President Cooper introduced him to the Board and informed him of his election to the office of Inspector of Fruit Pests.

Mr. Klee thanked the Board for the honor conferred, and declared his purpose to perform the duties of the office to the best of his ability.

Mr. Boggs referred to the fact that Mr. Klee then held an office in the State University, and on that account questioned his eligibility to the office of Inspector of Fruit Pests, and the members of the Board still expressed a desire that Mr. Klee should first resign his office in the State University before accepting the office of Inspector of Fruit Pests. The question was put to Mr. Klee, if he would resign his office in the State University? This Mr. Klee desired time to consider, when, on motion, the matter was referred to the Advisory Committee of the Board.

The Board then adjourned to November fifteenth, at Sacramento.

State Board of Horticulture,
Golden Eagle Hotel, Sacramento, November 17, 1886.

State Board of Horticulture met this day, with the following members present: Ellwood Cooper, B. M. Lelong, H. C. Wilson, W. M. Williams, General M. G. Vallejo, and N. R. Peck. President Cooper, in the chair, called the meeting to order.

Minutes of last meeting read and approved.

Report of Treasurer, M. G. Vallejo, read and approved, and ordered placed on file.

On the conclusion of the reading of the report of the Treasurer, the Secretary announced that there was considerable unexpended balance in the treasury, amounting to about $2,700.

On suggestion of Inspector Klee, that he was desirous of obtaining cuts for illustrating the forthcoming report, Commissioner Williams moved that the Secretary and Inspector be authorized to contract for such engravings, and that the sum of $1,000 be allowed for that purpose.

Motion carried unanimously.

Commissioner Lelong moved that the Secretary and Inspector be authorized to expend the sum of $250 for a microscope and accessories.

Motion carried.

The Secretary not having completed his report, was granted further time to prepare the same for our forthcoming report.

On motion of Commissioner Lelong, it was ordered that the State Printer be requested to print ten thousand copies of the biennial report, two thousand of these to be in muslin.

On motion, the Secretary was directed to eliminate such portions of the report of 1885 as he might deem necessary.

Inspector Klee then read his report, which was approved and ordered printed in the biennial report of the Board.

On motion of Commissioner Lelong, it was ordered when the Board adjourn, it be to such time and place as may be designated by the President.

November 19, 1886.

Board met at the Supreme Court Chamber, in State Capitol, Sacramento.

Meeting called to order by President Cooper.

Commissioner Williams moved that the next meeting of the Board be held in the City of Los Angeles, and that the President be authorized to fix the time and appoint committee of arrangements, and that at this time and place, the seventh State Fruit Growers' Convention be also held, under the auspices of the State Board of Horticulture.

Motion carried.

On motion, the President was authorized to appoint a committee of three to consider the resolution for the appointment of three assistant inspectors, or as they may deem best, and to ask the Legislature that the law be so amended, and also to ask the Legislature for ample appropriation for this Board, Ellwood Cooper to be President of said committee.

The President appointed Commissioners Lelong and Kimball as members of said committee.

On motion, the Board then adjourned, to meet at Los Angeles in April, 1887, at the call of the President.

ROOMS OF THE LOS ANGELES BOARD OF TRADE,
LOS ANGELES, CALIFORNIA, April 16, 1887.

Pursuant to call of President Cooper, the following members of the State Board of Horticulture met at nine o'clock A. M., viz.: Ellwood Cooper, A. Block, Dr. E. Kimball, Gen. M. G. Vallejo, and N. R. Peck.

President Cooper announced that B. M. Lelong had resigned as a member of the Board, and that the Governor had commissioned Mr. A. Scott Chapman, of San Gabriel, to fill the vacancy, and in a few and appropriate remarks welcomed Mr. Chapman into the Board.

On calling the roll, Commissioners Cooper, Block, Kimball, Vallejo, Peck, and Chapman were present, and Commissioners Boggs, Williams, and Wilson were absent.

Minutes of last meeting were read, Acting Secretary Chester stating that the minutes of last meeting were found outside of the minute book, and so much as was in the handwriting of Secretary Webb were incorporated in the minutes by him as Acting Secretary. That other memorandum of minutes were found in another handwriting bearing date of November 19, 1886, which were read, and upon the statement of President Cooper, that he remembered the substance of the minutes, they were read as a part thereof.

On motion, the minutes were approved as read.

President Cooper announced that the first business of the meeting was the election of all the officers of the Board; therefore, declared nominations for President in order.

On motion, President Cooper was unanimously reëlected President, by acclamation.

On motion, Rev. N. R. Peck was chosen Vice-President, by acclamation.

The next business in order was the election of Secretary.

President Cooper read section eight of the amended Act establishing the State Board, providing for the election, and prescribing the duties of Secretary.

Commissioner Block made statement of the act of the Executive Committee of the Board in appointing J. Chester as Secretary from the time of the death of Colonel Webb, until his successor was duly chosen, and thought the Board should take some action in approval of the act, and of the appointment by the Executive Committee.

Commissioner Peck moved that the act of the Executive Committee in appointing J. Chester Secretary of the Board, be approved and ratified. Motion carried.

Secretary read letter of Matthew Cooke, in which he announced himself as candidate for the office of Secretary, promising that if elected he would warrant to fulfill faithfully the performances of the duties of this office.

President Cooper stated that he had received several letters recommending candidates for Secretary, among them letters from Mr. Geo. Rice, and from Mr. Henry C. Wilson.

Commissioner Chapman nominated B. M. Lelong as Secretary.

President Cooper seconded the nomination.

Commissioner Kimball nominated J. Chester as Secretary.

Seconded by Commissioner Block.

Commissioner Block placed Matthew Cooke in nomination, stating that he felt that the compliment was due to Mr. Cooke for his services in the cause of horticulture.

The Acting Secretary requested permission to withdraw while the question of candidates was under consideration, which was granted.

After the discussion balloting was proceeded with, Commissioners Kimball and Chapman were appointed tellers, with the following result: First ballot—Cook two, Lelong two, Chester one, blank one. Second ballot—Lelong four, Chester two. B. M. Lelong, having received a majority of all the votes cast, was declared, on motion, to be the choice of the Commissioners present for the office of Secrtary of the Board for the term of two years, or during the pleasure of the Board.

The next in order was the election of a Treasurer.

On motion of Commissioner Block, Gen. M. G. Vallejo was unanimously reëlected Treasurer, by acclamation, for the term of two years, or during the pleasure of the Board.

The next in order was the election of an Auditor.

On motion of Commissioner Block, Dr. Edwin Kimball was unanimously reëlected Auditor by acclamation for the term of two years, or during the pleasure of the Board.

The next in order was the election of an Inspector of Fruit Pests.

On motion of Commissioner Kimball, W. G. Klee was unanimously reëlected State Inspector of Fruit Pests by acclamation for the term of two years, or during the pleasure of the Board.

The President appointed Commissioner Chapman to notify B. M. Lelong of his election as Secretary, and to instruct him to take the oath of office, and to appear before the Board.

The Acting Secretary read the oath of office to B. M. Lelong as Secretary.

On motion of Commissioner Peck, Commissioners Cooper, Kimball, and Block were unanimously chosen the Executive, or Advisory Committee, of the Board, for the term of two years, or during the pleasure of the Board.

On motion of Commissioner Block, State Inspector Klee was authorized, under the direction of the President, to print five thousand copies of Bulletin of Insect Pest Remedies at Riverside.

On motion of Commissioner Block, the State Inspector, Klee, was authorized, under the direction of the Executive Committee, to make experiments as might be deemed necessary.

On motion of Commissioner Vallejo, Santa Rosa was unanimously chosen as the place of meeting of the next Fruit Growers' Convention, the time therefor to be fixed by the Executive Committee.

President Cooper suggested the moving of the office to some place on Market Street, in San Francisco, and stated that the suggestion came from some of the members of the Board, who thought the plan advisable.

Commissioner Kimball stated that in conjunction with the former Secretary, he had sought for other rooms for use of the Board, but that none could be had equal to those now occupied, without double the present rent, and moved that the question be left with the Executive Committee.

Motion carried.

President Cooper called for report of Inspector Klee, who was granted further time, his report having been detained on the way.

Commissioner Peck moved that the thanks of the Board be extended to the Acting Secretary for his very efficient conduct of the duties of Secretary during the illness and since the death of the former Secretary.

Motion carried.

Bills presented:

Riverside Press, printing	$1 50
Riverside Press, printing bulletins	25 00
Times-Mirror Publishing Company, printing programmes	12 00
F. H. McAllister, reporting convention	150 00
Riverside Citrus Fair Association, rent	80 00
Riverside Citrus Fair Association, watchman	24 00

Commissioner Kimball moved that the bill of the Riverside Citrus Fair Association be referred to the Secretary, with instructions that he obtain further enlightenment thereon, to be considered at the next meeting of the Board.

Motion carried.

Commissioner Block moved that all other bills be paid.

Motion carried.

On statement of Secretary Lelong, Commissioner Block moved that the Secretary obtain needed books and desks for office, subject to the approval of the Auditor of the Board.

Motion carried.

Report of Treasurer Vallejo was read and approved. The report covered the time from November 1, 1886, to March 31, 1887, making the following exhibit:

State appropriation		$10,000 00
Disbursements for bills of expense from April to October, inclusive	$1,402 47	
Salary of Secretary, same time	1,050 00	
Salary of Inspector, same time	1,400 00	
		$3,852 47
Expenses.		
November, 1886	$563 87	
December, 1886	136 05	
January, 1887	137 72	
February, 1887	582 95	
March, 1887	357 15	
		$1,777 74
Salary Inspector, five months	$1,000 00	
Salary Secretary, five months	750 00	
		$1,750 00
		$7,380 21
Balance remaining in treasury end of fiscal year		$2,619 79

Acting Secretary J. Chester then read his report, which, on motion, was ordered placed on file and spread upon the minutes.

Upon the suggestion in the report of Acting Secretary of the death of Colonel A. H. Webb, former Secretary of the Board, Commissioner Kimball offered the following resolution:

Resolved, By the State Board of Horticulture assembled at Los Angeles, this sixteenth day of April, 1887, that in consideration of the eminent services of the late A. H. Webb, in his long administration of the duties of Secretary of the State Board of Horticulture, the Board has duly appreciated his eminent ability and his unremitting devotion to the horticultural interests of this State, and the courtesy and friendly regard that has always existed among us in these relations; and that in his death the Board has lost a valuable officer, and the horticulturists of the State a firm and efficient friend; and that this Board tender to the family of our late esteemed Secretary their high appreciation of his public and private worth, and their sympathy and consolation in this their great affliction.

Commissioner Block moved that the resolution be adopted, spread upon the minutes, and a copy thereof be sent by the Secretary to the family of the late Secretary.

Motion adopted.

On motion, the meeting then adjourned to meet in November, 1887, at the office of the Board, in San Francisco, at the call of the Executive Committee.

MEETING OF EXECUTIVE COMMITTEE OF STATE BOARD OF HORTICULTURE.

Office of the Board, June 30, 1887.

Meeting was called to order by President Cooper.

Present, Commissioners Ellwood Cooper, Dr. Edwin Kimball, A. Block.

On motion of Mr. Block, Tuesday, November eighth, to Friday, November eleventh, inclusive, was the date fixed for the holding of the eighth State Fruit Growers' Convention, at Santa Rosa, under the auspices of the State Board of Horticulture.

The President then appointed Gen. M. G. Vallejo and Dr. Kimball on Committee of Arrangements. Mr. W. G. Klee was instructed to assist the committee.

On motion of Mr. Block, State Inspector Klee was authorized to procure the assistance of a chemist to experiment; to discover, if possible, a process by which the orchardists of this State can manufacture their own caustic soda, having all the necessary ingredients, on this coast, and to file a full report thereof at the convention, at a cost not to exceed $100.

On motion of Dr. Kimball, it was ordered that the Board shall meet at the office of the Board, in San Francisco, on November 7, 1887, at ten o'clock.

State Inspector Klee and Dr. Kimball were authorized to have made ten analyses of fruit sprayed with arsenites, at a cost not to exceed $50.

On motion, the programme for the forthcoming convention was referred to the President.

On motion, the appointment of standing committees for 1887–88 was also referred to the President.

The following gentlemen were requested to prepare essays on the following subjects, to be presented at the convention:

W. H. Aiken, Wrights, on Prunes.

Milton Thomas, Los Angeles, on Crystallized Fruits.

A. T. Hatch, Suisun, on Fruit Unions.

A. Scott Chapman, San Gabriel, on Fertilizers for the Orchard, and on Fumigating Trees, for the Destruction of Insect Pests, with Chemical Gases.

C. W. West, Fresno, on the True Smyrna Fig.

W. M. Williams, Fresno, on Fruit Drying.

C. F. Lieb, San José, on Fruit Drying.

Geo. A. Fleming, San José, on Fruit Drying.

Dr. Edwin Kimball, Haywards, on Dates and Apricots.

N. R. Peck, Penryn, on Orange Culture.

I. A. Wilcox, Santa Clara, on Small Fruits.

Professor Hilgard and W. G. Klee, on Insect Pests and Remedies.

Ellwood Cooper, Santa Barbara, on Olive Culture.

H. Weinstock, Sacramento, on Railroad Transportation.

Gilbert Tompkins, San Lorenzo, on Fruit Packages.

On motion, it was ordered that the rooms offered by A. Hayward, at 220 Sutter Street, for offices of the Board, be accepted, provided that they can be had for two years, with the privilege of five.

On motion, the committee then adjourned.

LIST OF BOOKS AND SCIENTIFIC WORKS

In the Library of the State Board of Horticulture.

AUTHOR.	Title of Books.
Allen	American Farm Book.
Armstrong	Treatise on Agriculture.
Barnard	The Strawberry Culture.
Barry	Fruit Garden.
Baker	Practical and Scientific Fruit Culture.
Berger	Pomolgie Generale, 12 vols.
Bernays	Horticultural Industries for Queensland.
Boyer and Vines	Practical Botany.
Breuil	Fruit Culture (translated from the French).
Bridgeman	Cultivators' Manual.
Church (Ella Rodman)	The Home Garden.
Chorlton's	Grape Growers' Guide.
Culver	Fruit Preservers' Manual.
Collins	Hop Culture.
Cole	American Fruit Book.
Davis	Orange Culture.
Dewey	Nurseryman's Specimen Book, 3 vols.
Downing and Gray	Fruit Culture.
Downing	Selected Fruits.
Downing	Rural Essays.
Downing	Fruit and Fruit Trees of America.
Downing	Landscape Gardening.
Earl	English Plant Names.
Elliott	Hand Book for Fruit Growers.
Elliott	Western Fruit Growers' Guide.
Enfield	Indian Corn.
Field	Pear Culture.
Flagg	Hand Book Sulphur Cure.
Flint	Geyelin Poultry Breeding.
French	Farm Drainage.
Fritz	Sweet Potato Culture.
Fogg	Herefordshire Pomona, 2 vols.
Fulton	Peach Culture.
Fuller	Small Fruit Culturist.
Fumer	Practical Floriculture.
Glenny	Gardening for Profit.
Glenny	Cranberry Culture.
Glenny and Ormerod	Peach and Nectarine Culture.
Gregg	Hand Book of Fruit Culture.
Harris	Talks on Manures.
Hooper	Western Fruit Book.
Hogg	The Fruit Manual.
Horcourt	Florida Fruits.
Hussman	Grape Growing and Wine Making.
Jaques	Management of Fruit Trees.
Jauger	Life of North American Insects.
Johnson	The Fern and Fern Allies of Great Britain.
King	Bee Keeping.
Langstroth	The Honey Bee.
Longworth	Strawberry Culture.
Longman	Encyclopedia of Plants.
Loudon	Encyclopedia of Gardening.
Loudon	Encyclopedia of Plants.
Orange Judd	The Gardener's Text-Book.
Orange Judd	American Farm Book.
Orange Judd	Farm Gardening and Seed Growing.
Orange Judd	My Vineyard at Lakeview.
Orange Judd	Flax Culture.
Phin	Grape Culture.
Popenoe	Tobacco Culture.
Paxton	Botanical Dictionary.

LIST OF BOOKS AND SCIENTIFIC WORKS—Continued.

AUTHOR.	Title of Books.
Quinn	Pear Culture for Profit.
Quincy	Soiling of Cattle.
Quinby	New Bee Keeping.
Robinson	Landscape Gardening.
Roe	Success With Small Fruits.
Rixford	Wine Press and Cellar.
Rivers	The Orchard House.
Rivers	Fruit Garden.
Smee	My Garden.
Smith	Diseases of the Field and Garden.
Strong	Fruit Culture.
Spaulding	Orange Culture.
Scribner's Sons	Encyclopedia Britannica, 26 vols.
Stockhardt	Chemistry.
Todd	Apple Culturist.
Thomas	American Fruit Culture.
Thompson	The Gardener's Assistant.
Waring	Draining for Profit and Health.
Warden	American Pomology.
Wilson	Drainage for Health.
Wilson	Our Farm Crops.

ON ENTOMOLOGY.

AUTHOR.	Title of Books.
Apta	Economic Entomology.
Ballard	Insect Life.
Brow	British Moths.
Brown	British Butterflies.
Buckton	British Aphides, 4 vols.
Buckley and Cooke	Fungi.
Cameron	British Phytophagous.
Cameron	British Hymenoptera.
Cox	Book on Coleoptera.
Cooke (M. C.)	Cryptogamic Botany.
Cooke (M. C.)	Microscopic Fungi.
Cooke (Matthew)	Insects Injurious to Orchard and Vineyard.
Curtis	Farm Insects.
Douglas and Scot	British Hemiptera.
Dodd	Farm Insects.
Duncan	Transformation of Insects.
Figuirer	Insect World.
Flint (Harris)	Insects Injurious to Vegetation.
Jaeger	The Life of North American Insects.
Kerby and Spence	Entomology, 2 vols.
Lubbock	Monograph of the Collembula and Thysamera.
Lubbock	Ants, Bees, and Wasps.
Ormerod	Insect Life.
Packard	Guide to Study of Insects.
Packard	Half Hour with Insects.
Packard	Our Common Insects.
Rye	British Beetles.
Riley	Locust and Grasshopper Plague.
Saunders	Insects Injurious to Fruit.
Stephens	British Beetles.
Treat	Insects Injurious to Farm and Garden.
Tremble	Insect Enemies to Fruit.
Van Bruysel	Population of an Old Pear Tree.
Westwood	British Butterflies.
Westwood	British Moths.
Westwood	British Moths, Natural History.
Westwood	Arcana Entomology, 2 vols.
Willet	Wonder of Insect Life.
Wood	Renerus Insect Architecture.
Wood	Insects at Home.

REPORTS.

Report, Agricultural Department.
Report, American Pomological Society.
Report, Entomological Society of Ontario.
Report, Forestry Commission (California).
Report, Forestry Commission (Kansas).
Report, Illinois State Horticultural Society.
Report, Iowa State Horticultural Society.
Report, Indiana State Horticultural Society.
Report, Kansas State Horticultural Society.
Report, Maine State Horticultural Society.
Report, Massachusetts State Horticultural Society.
Report, Minnesota State Horticultural Society.
Report, Michigan State Horticultural Society.
Report, Missouri State Horticultural Society.
Report, Mississippi State Horticultural Society.
Report, Montreal Horticultural Society.
Report, Ohio State Horticultural Society.
Report, Pennsylvania State Horticultural Society.
Report, Illinois Department of Agriculture.
Report, Bureau of Animal Industry.
Report, Smithsonian Institute.
Report, Maine Pomological Society.
Report, United States Entomological Commission.
Report, State Viticultural Commission.
Report, State Agricultural Society.
Report, State Railroad Commission.
Report, State University.
Report, Ohio Agricultural Experiment Station.
Report, Royal Commission of Vegetable Products.
Report, Department of Agriculture, Botanic Division.
Report, New Zealand Agricultural Department.
Report, Agricultural College of Michigan.
Report, On the Locusts of California, by Coquellette.
Report, S. A. Forbes on the Codlin Moth.
Report, Horticultural Society of Victoria.
Report, Commissioner of Agriculture of Missouri.
Report, Botanic Garden (Australia).
Report, California Mining Bureau.
Report, Statistician of United States.
Report, Statistician of California.
Report, Immigration Association of California.
Report, State Board of Equalization.

MISCELLANEOUS.

A Treatise on Olive Culture, by Ellwood Cooper.
A Treatise on Olive Culture, by F. Pohndorff.
The Plants of New South Wales.
Fruit Culture in Colorado.
California at the American Exposition.
Reports of Injurious Insects, by Cooke and Chapin.

HORTICULTURAL PAPERS.

American Horticulturist.
American Agriculturist.
Farm and Home.
Farm Garden.
Carter's Farmers' Hand Book.
Pacific Rural Press.
Santa Clara Valley.
Rural Californian.
Pacific Fruit Grower.
Semi-Tropical Planter.
Rural New Yorker.
Canadian Horticulturist.
Also, all the leading daily and weekly papers of this State.

INDEX.

A

PAGE.

- ACT—To amend Act of 1883 — 10
  - To create and establish a State Board of Horticulture — 8
  - To prevent the spreading of fruit pests and diseases — 10
  - To promote the horticultural interests of the State — 7
- ADDRESSES—List of — 160
- ADDRESS—Hon. Ellwood Cooper, Los Angeles Convention — 32
  - Hon. Ellwood Cooper, Sacramento Convention — 188
  - Prof. C. V. Riley, Riverside Convention — 450
- ADDRESS OF WELCOME—Hon. Stephen M. White — 46
  - H. J. Rudisill — 440
- ALLEGRETTI, I.—Letter from — 490
  - Letter to Convention on fruit treatment — 303
- ALMONDS — 434
  - Discussion — 325
  - Essay (*Hatch*) — 324
- AMERICAN RIVER — 351
- ANTI-INSECT LAWS—(*Cooper*) — 37
- APPLE, THE — 167
  - Essay (*Shinn*) — 281
  - Evaporated — 432
  - Pruning — 283
  - Soil for — 282
  - Sun-dried — 430
  - Varieties of — 284
- APRICOT, THE — 165
  - Evaporated — 432
  - Sun-dried — 432
- APPENDIX — 437
- APPLICATION OF REMEDIES—Manner and time of — 564
- ARSENIC—Test for — 212

B

- BALDRIDGE, M.—Essay, "Conditions of Citrus Culture" — 550
- BANDAGES AROUND TRUNK—(*Riley*) — 459
- BERGER, MRS. H. H.—Essay on Japanese fruits — 442
- BLACKBERRIES—Propagation of (*Wilcox*) — 234
- BOOKS—List of, at State Board office — 574
- BROODS, INSECT—(*Klee*) — 407
- BULLETIN [INSPECTORS] No. 4 — 558
  - No. 6 — 562

C

- CACHE CREEK — 353
- CALIFORNIA FRUIT UNION—(*Livermore*) — 80
- CALIFORNIA ORCHARDS — 14
- CARPENTERIA — 359
- CHAPIN, O. S.—"Tree Planting" — 542
- CHAPMAN, A. S.—Essay, "Fertilization of Orange Orchards" — 488
- CHERRY, THE—(*Gray*) — 277
  - (*Klee*) — 370
  - Discussion — 279
- CHUBB, DR.—Remarks at Riverside Convention — 472
- CITRUS CULTURE, CONDITIONS OF—(*Baldridge*) — 550
- CITRUS FRUIT PESTS—(*Boggs*) — 16
- CITRUS FRUITS—How to pick, pack, and ship—(*Dobbins*) — 535
- CITRUS JAPONICA—(*Berger*) — 446
- CITRUS TREES—Scale insects affecting — 376

PAGE.

- COAST REGION—San Diego County 365
- CODLIN MOTH 206, 560
  - Destruction of 211
  - Killing young larvæ in fruit 207
  - Remedies against 562
- COLD STORAGE—(*Stow*) 491
  - Report of committee 502
- COMMITTEE—On fruit packages 281
  - On laws 324
  - On railroad transportation 306
- CONGRESS, MEMORIAL TO 497
- CONTRA COSTA COUNTY 370
- CONVENTION—Fifth Annual, adjournment of 185
  - Fifth Annual, members of 186
  - Sixth Annual 187
  - Sixth Annual, members of 187
  - Seventh Annual 439
- COÖPERATION—(*Rice*) 540
- COOPER, HON. ELLWOOD—Remarks at Riverside Convention 439
  - Address at Los Angeles Convention 32
  - Address at Sixth Annual Convention 188
- COTTONY CUSHION SCALE—(*Klee*) 561
- COUNTY CONVENTION—Committees appointed 68
- COUNTY COMMISSIONS 55
- CULTIVATION AND PRUNING 161
  - Discussion 241
- CURLED LEAF 174
- CYCLONE NOZZLE 464

D

- DAVISVILLE 352
- DEATH OF YOUNG TREES—Cause of 413
- DECIDUOUS FRUITS—Fungoid diseases affecting 408
  - Report 153
- DOBBINS, COL. J. R.—"How to Pick, Pack, and Ship Citrus Fruits" 535
- DRAINAGE 413
- DRIED FRUITS 513
  - Product of 1886 428

E

- EL CAJON 366
- EL DORADO COUNTY 369
- ESSAY—Fertilization of Orange Orchards (*Chapman*) 488
  - Planting and Pruning an Orchard (*Kells*) 267
  - Table Grapes (*Husmann*) 246
  - The Almond (*Hatch*) 324
  - The Apple (*Shinn*) 281
  - The Cherry (*Gray*) 277
  - The Fruit Interests of Northern Sacramento Basin (*Moulton*) 286
  - The Olive (*Cooper*) 327
  - The Olive (*Klee*) 417
  - The Prune (*Aiken*) 290
- EVAPORATED FRUITS 432-433
- EVERGREEN TREES 388
- EXECUTIVE COMMITTEE—Minutes of 573
- EXHIBIT OF FRUIT, REPORT OF COMMITTEE 504

F

- FERTILIZATION 202
- FIG—Budding the 146
  - Caprification (*Eisen*) 116
  - Crops and their treatment 111
  - Crystallizing 301
  - Cultivation and preparation for market in California 294
  - Discussion 299
  - Essay (*Eisen*) 114
  - Essay (*Williamson*) 294
  - Facts about the 301
  - Irrigating—Discussion 144
  - Packing for market 299
  - Planting and cultivation 109

PAGE.

- FIG—Planting and caring for orchards ... 298
  - Practice of caprification ... 301
  - Pruning the trees ... 298
  - Soil and climate for ... 108
  - Sun-dried ... 431
- FIG-DRYING (*Eisen*) ... 114
  - Discussion ... 142
- FIG-GROWING ... 139
- FISH-OIL SOAP—Recipe for (*Lelong*) ... 377
- FOOD PLANTS (*Riley*) ... 451
- FORESTRY—Remarks on ... 127
- FORESTS AND FRUIT GROWERS (*Kinney*) ... 118
- FREIGHT RATES (*Cooper*) ... 38
- FRENCH PRUNE ... 291
  - How to prune—Discussion ... 269
- FRESNO COUNTY ... 355
- FRUIT—Crop for past six years in California ... 511
  - Drying ... 260
  - Gathering and curing ... 75
  - Interests in Northern Sacramento Basin (*Moulton*) ... 286
  - Marketing ... 37, 68
  - Shipments by railroad ... 427
  - Varieties of ... 181
  - What to plant ... 139
- FRUIT EXHIBIT—Committee ... 497
  - Reports on ... 152
- FRUIT GROWERS—California Association of Sacramento ... 27
  - Coöperation of (*Rice*) ... 537
  - Report of semi-annual convention ... 439
- FRUIT GROWING—Profits of (*Rice*) ... 537
- FRUIT INDUSTRY—Protection of ... 37, 156, 178, 334
  - Memorial to United States Congress ... 325
- FRUIT PACKAGES—(*Tompkins*) ... 498
  - Committee ... 281
  - Discussion ... 250
- FRUIT PESTS—Inspectors of ... 424
  - Act to prevent spread of ... 10
- FRUIT SHIPPING—Address (*Livermore*) ... 78
- FRUIT TREES—Acres of land planted to ... 425
- FRUIT UNION—Discussion ... 90
  - Officers and members of ... 26
- FUMIGATION—(*Riley*) ... 458
- FUNGI—Experiments ... 410
  - Nature of ... 408
  - Remedies to be tried ... 412
  - Successful remedy for ... 410
- FUNGOID DISEASES—Affecting deciduous fruits ... 408

G

- GASES—Use of, against scale insects (*Morse*) ... 390
- GAS LIME ... 401
- GAS TREATMENT ... 389
- GEIGER WASH ... 375
- GOOSEBERRY—(*Kelsey*) ... 235
  - Discussion ... 274
  - Propagation of (*Wilcox*) ... 235
- GRAFTING—Hints on ... 555
- GRAFTING WAX ... 556
- GRAPES—Best for table and market ... 246
  - Sun-dried ... 431

H

- HARDPAN—How to prevent ... 130
- HOLT, L. M.—Remarks ... 496
- HORTICULTURAL—Act to promote the interests of, in this State ... 7
  - Papers ... 576
  - Books recommended (*Cooper*) ... 34
- HORTICULTURE—(*Cooper*) ... 32
- HUSMANN—Essay, "Quince" ... 247
  - Essay, "Table Grapes" ... 246

I

PAGE.

- ICERYA—Characteristics of (*Riley*) 451
  - Mode of spread and distribution 451
- ICERYA PURCHASI—(*Klee*) 379
  - Description 380
  - Habits 387
  - Rate of growth 387
  - Remedies for suppression of 388
  - Remarks on (*Lelong*) 213
- INFESTED FRUIT—Picking off 211, 564
- INSECT FIGHTING—Discussion 49
- INSECT PESTS—Prosperity vs. (*Riley*) 462
- INSECT REMEDIES—(*Cooper*) 34
- INSECTS—Habits of 373
  - Preying on scale insects 404
  - Ravages of (*Cooper*) 36
  - Remedies against 373
  - Report on 373
- INSPECTORS OF FRUIT PESTS 424
- IRRIGATION 202

J

- JAPANESE FRUITS—Essay (*Mrs. H. H. Berger*) 442
  - Loquat 446
  - Orange 445

K

- KERN COUNTY 358
- KELSEY—"Gooseberry" 235
- KEROSENE—(*Klee*) 374
- KLEE, W. G.—Address at Riverside Convention 462
  - Essay, "Olive" 417
  - Scale insects and codlin moth 206
  - Report, April 16, 1887 367

L

- LACE-WINGED FLIES 406
- LADYBUG, THE 404
- LARVÆ [CODLING MOTH]—Measures to catch 564
  - Banding system of catching 210
- LEGISLATION—(*Riley*) 459
- LELONG, B. M.—Remarks at Riverside Convention 472
  - Remarks at Sacramento Convention 213
- LEMON, THE—(*Chapman*) 97
- LIBRARY—State Board of Horticulture 574
- LIVERMORE, H. P.—Address, "Fruit Shipping" 78
- LONDON PURPLE 563
  - Use of 210
- LOS ANGELES COUNTY 361
- LOS GATOS 346

M

- MAMMOTH CHESTNUT—(*Berger*) 444
- MASKELL, W. M.—Letter to Inspector Klee 393
- MERCED COUNTY 357
- MISCELLANEOUS FRUITS—Report on 154
- MUIR PEACH 147

N

- NECTARINES—Evaporated 433
  - Sun-dried 431
- NEW FRUITS 146
- NOMENCLATURE 137
- NOMENCLATURE, INSECT—(*Riley*) 450

O

- OIL, OLIVE—Filtering or clarifying (*Cooper*) 329
  - Making 329
- OLIVE, THE 13

PAGE.

- OLIVE, THE—Adaptation in many counties 417
  - Discussion on 331
  - Diseases of 330
  - Diseases of and remedies for (*Cooper*) 331
  - Essay (*Cooper*) 327
  - Essay (*Klee*) 417
  - Filtering or clarifying 329
  - Fruit bearing 328
  - Fruit picking 328
  - Growing (*Pohndorff*) 517
  - Making oil 329
  - Picking 330
  - Propagation of 327
  - Pruning 327
- ORANGE, THE 369
  - Best varieties 105
  - Crops in orchard 102
  - Cultivation of 101
  - Discussion on 200
  - Essay (*Bettner*) 191
  - Fertilizing 102
  - Fertilizing (*Bettner*) 194
  - Fertilizing (*Chapman*) 488
  - General conditions necessary for success 196
  - Growing 98
  - Insects destructive to, and remedies 104
  - Irrigation of (*Garey*) 99
  - Irrigating trees—Discussion 128
  - Plan of orchard 100
  - Protection from frost (*Bettner*) 194
  - Pruning 103, 160, 193
  - Selection and purchase of trees 100
  - Selection of a proper site 99
  - Soil for growing (*Garey*) 99
  - Transplanting orchards 100
- ORANGE GROWERS—Protective Union of Southern California 27
- ORCHARD—Arrangement of (*Chapin*) 544
  - Planting and pruning (*Kells*) 267
- ORCHARDS—Conditions of (*Klee*) 345
  - San Mateo County 345
  - Santa Clara County 346
- ORGANIZATION—Unity in (*Livermore*) 85

P

- PACIFIC COAST NURSERYMEN'S ASSOCIATION—Officers and members of 26
- PACKING—Improvement in 429
- PAJARO VALLEY 349
- PARASITES—(*Klee*) 404
  - Importation of (*Riley*) 461
- PARIS GREEN 562
  - Use of 209
- PASADENA 362
- PEACHES—Evaporated 433
  - Sun-dried 430
- PEACH MOTH—(*Boggs*) 16
  - (*Klee*) 561
- PEACH, THE 173
  - Sun-dried 147
- PEAR, THE 170
  - Sun-dried 431
- PESTS—Laws to prevent spread of 60
- PLACER AND EL DORADO COUNTIES 367
- PLEASANT VALLEY 353
- PLUMS—Evaporated 433
  - Sun-dried 431
- POHNDORFF, F.—Memoir, "Olive Growing" 517
- PREVENTIVE MEASURES—(*Riley*) 452
- PROCEEDINGS—Fifth State Fruit Growers' Convention 32
  - Sixth State Fruit Growers' Convention 187
  - Seventh State Fruit Growers' Convention 439
  - State Board of Horticulture 565
- PRUNE, THE 175
  - California French 429

PAGE.
PRUNE, THE—Culture of 292
  Essay (*Aiken*) 290
  French 291
  Method of curing 293

Q

QUINCE—As a market fruit 247

R

RAILROAD RATES—(*Livermore*) 84
RAILROAD—Shipments of fruit by 427
  Transportation—Discussion 306
  Transportation—Telegrams 324
RAISINS 136
RASPBERRIES—Propagation of (*Wilcox*) 233
RED SCALE—Remedy for (*Lelong*) 469
REMEDIES—(*Riley*) 453
  For scale (*Klee*) 376
  For diseases of olive (*Cooper*) 331
  For various pests (*Boggs*) 12
  For red scale (*Lelong*) 469
REPORT—April 16, 1887 (*Klee*) 367
  Commissioner Second District (*Boggs*) 17
  Fruit Growers' Convention at Riverside 439
  At Los Angeles 32
  At Sacramento 187
  Inspector Boggs up to April 15, 1886 12
  Secretary 424
  Treasurer, ending March 31, 1886 21
  Treasurer, from April 1, 1886, to October 30, 1886 24
REPORTS 576
  Adoption of 156
  Deciduous fruits 153
  Fruit exhibits 152
  Inspector Klee 343
RESISTANT STOCK 402
RESOLUTIONS—Riverside Convention 481–483
RESTORING OLD TREES 15
RICE, GEORGE—Profits of Fruit Growing and Coöperation of Fruit Growers 537
RILEY, PROF. C. V.—Address at Riverside Convention 450
  Letter to "Rural Press" 394
  Resolution thanking 481
RIVERSIDE—(*Klee*) 364
  (*Riley*) 460
RUDISILL, H. J.—Address at Riverside Convention 440

S

SACRAMENTO COUNTY 351
SAN BERNARDINO COUNTY 364
SAN DIEGO COUNTY 365
SAN GABRIEL VALLEY 362
SAN JACINTO 366
SAN JOAQUIN COUNTY 356
SANTA BARBARA COUNTY 358
SANTA CLARA ORCHARDS 347
SANTA CRUZ COUNTY 348
SANTA ROSA VALLEY 350
SAP—Rise of, in trees 414
SARATOGA ORCHARDS 346
SCALE INSECTS—(*Boggs*) 12
  (*Klee*) 373
  Affecting citrus trees 376
  Use of gases against (*Morse*) 390
SHASTA COUNTY 371
SOIL—Preparation of (*Chapin*) 543
SOLANO COUNTY 353
SONOMA COUNTY 349
SPRAYING—Actual cost of 560
  Apparatus for 457
STATE BOARD OF HORTICULTURE—Act to create and establish 8

PAGE.

STATE BOARD OF HORTICULTURE—Minutes of semi-annual meetings 28
    April 23, 1885 28
    November 19, 1885 30
    November 21, 1886 30
    November 22, 1886 31
  Proceedings of 1886 565
  Officers and members 2
STATE ENTOMOLOGIST 460
STOW, G. M.—Remarks at Riverside Convention 491
STRAWBERRY, THE—(*Wilcox*) 228
  Borers and other pests 232
  Diseases of the plant 232
  Planting and irrigating 230
  Producing new varieties 231
  Sexual character of plants 231
  Special conditions for success 230
  Varieties of 229
  Varieties to plant 231
SULPHUR 210
SULPHIDE OF SODA 210
SUTTER COUNTY 370
SYRPHUS FLIES 406

T

TABLE OF CONTENTS 5
TABLE—Showing number of fruit trees in the different counties of the State 426
THISSELL'S TRAP 211
TOMPKINS, G.—Essay on fruit packages 498
TRANSFORMATION—(*Klee*) 407
TREE-PLANTING—(*Chapin*) 542
  (*Cooper*) 38
TREES—Care of, before planting (*Chapin*) 359
  Schedule showing number growing in 1886 515
TRUE LABELS 185
TULARE COUNTY 357
TURPENTINE—In grafting wax 556
TUSTIN CITY 362

U

UNION DISTRICT 347
UNITY—In organization (*Livermore*) 85

V

VACA VALLEY 354
VALLEJO, GENERAL M. G.—Annual report of 21
  Speech at Riverside Convention 506
VARIETIES—Adaptation of 151
  Of fruit 131
VENTURA COUNTY 360
VISALIA 357

W

WALNUTS 433
  Culture of—Discussion 334
  The English (*Cooper*) 332
WASHES—Containing free oil 374
  Mode of preparing 559
  Winter 558
WEBB, A. H.—Resolution in memory of 572
WHALE-OIL SOAP—And sulphide of soda 210
WHEN TO PLANT—(*Chapin*) 543
WHITE ARSENIC 563
WHITE, HON. STEPHEN M.—Address of welcome 46
WINTERS SECTION 353
WOODLAND 352
WOOLLY APHIS 400, 560

Y

YOLO COUNTY 352

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